STANDARD SERVICE ARITHMETICS

GRADE THREE

KNIGHT
STUDEBAKER
RUCH

Standard Mathematical Service

Lauro
Cox

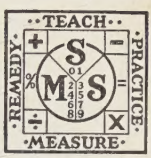
16 so 24 st
age 9
H 3
or
So 4

Digitized by the Internet Archive
in 2024

https://archive.org/details/standardservicea0000knig

Standard Mathematical Service

Edited by George W. Myers



Standard Service Arithmetics

GRADE THREE

by

F. B. KNIGHT
College of Education, University of Iowa

J. W. STUDEBAKER
Superintendent of Schools, Des Moines, Iowa

G. M. RUCH
College of Education, University of California

SCOTT, FORESMAN AND COMPANY
CHICAGO ATLANTA NEW YORK

Copyright, 1926, by
Scott, Foresman and Company

294.7

PREFACE

The *Standard Mathematical Service* is an organized enterprise, the first of its kind, attempting to provide adequate teaching tools for assisting in the mathematics teacher's four-fold professional task: "teach-practice-measure-remedy." The Standard Service Series of Arithmetics, of which the present volume is for the third grade, is a main unit of this Service.

The *Standard Service Arithmetics* are a conscious and consistent attempt to apply the known facts about child-learning to arithmetic teaching. These facts have been drawn from the classroom experience of hundreds of teachers and from careful experimentation, carried out over a period of several years. The material and organization of all books of the series have been tried out and digested into final form after classroom use by pupils drawn from all parts of the United States.

This book of the Standard Service Series, which is for third grade, employs important principles of learning through the following seven features which appear consistently throughout the year's work:

(1) Gradual, detailed development of new topics, with careful regard to the vocabulary, illustrations, and explanations used.

(2) Scrupulously calculated distribution of drill and review (*a*) to insure proper amounts of periodic practice on the basic number facts and processes, and (*b*) to prevent the forgetting of what has been previously learned.

(3) The systematic use of motivating devices such as: (*a*) games, races, puzzles, pictures, etc., that make an appeal to the third-grade child; (*b*) legitimate appeal to the spirit of competition with the pupil's own past records and with the standards achieved

in tests and races by thousands of other third-grade children; (*c*) consistent employment of the principle of "awareness of success or failure at the time of learning" through the agency of Self-Testing Drills, Problem Scales, and self-measuring exercises; and (*d*) prevention of initial discouragement through easy mastery by a leisurely, step-by-step unfolding of topics.

(4) Provisions for securing an active, critical, social, and self-reliant attitude toward the learning of arithmetic.

(5) Explicit lessons to give children an insight into problem analysis and problem study, with detailed guidance in habits of estimating and judging intelligently.

(6) The systematic measurement of achievement with the attendant recognition of individual differences through Self-Testing Drills, Problem Scales, and other standardized material, the units of which are carefully correlated with the general subject-matter and distributed throughout the year.

(7) The consistent training of the pupil in good habits of using his book as a learning tool. In the body of the text and in the Self-Help Practice Lessons, the pupil is taught how to help himself with the precise difficulties on which he finds he needs restudy and repractice. The reading simplicity of this book is such as to raise it above the customary reference-book type of text to the plane of a real learning instrument for a third-grade pupil. Good habits of using such a text will contribute powerfully toward good study habits in general, as well as toward early self-reliance.

One of the most striking features of the *Standard Service Arithmetics* is the generous amount of space taken in presenting the work for each grade. This expanded presentation is the result of careful experimenting and deliberate decision on the part of the authors. Through years of patient, intensive, experimental study they proved to themselves that a genuinely modern treatment of arithmetic, based on the scientific findings of the last decade, demands leisurely and expansive development. They were then

faced with a critical question: Should they attempt to compress their treatment into books of the conventional size, or should they break with tradition and present the work in the manner dictated by their findings?

The decision made is evident from an examination of the *Standard Service Arithmetics.* In the minds of the authors there could be no thought of trimming the final product to the dimensions and character of the customary reference-book type of text, thereby discarding the results of careful investigations made over a period of years. The necessities of the undertaking have, therefore, forced the authors to the preparation of a series of arithmetics distinct in their expansiveness of treatment.

The main items requiring greater space allotments fall into three groups:

I. Definite pedagogical undertakings that demand expansive treatments. (1) Development, step by step, of scientifically itemized stages of difficulty in new arithmetical processes and topics, by advances so gradual and so copiously illustrated, exemplified, and practiced on as to be easily within the grasp of the child.

(2) Numerous silent-reading exercises in chatty and informal language for child appeal. These lessons, oftentimes with pictorial and diagrammatic aids, provide stimulating instruments for self-teaching.

(3) Carefully devised lessons which assist the learner in problem-solving, with problem settings drawn from real life. These units also train the pupil in estimating results and in the technique of checking. The instructions and sample treatments given in these units have, through the ordeal of varied and crucial experimentation, proved their worth.

(4) Twenty-six standardized Self-Testing Drills for the maintenance of acquired skills and for the systematic self-measurement of pupil progress.

(5) Fourteen standardized Problem Scales, which make a persistent attack on the problem-solving difficulties of children. These "scales," requiring from two to three pages each, clearly make for bulk; but experimentation has proved this use of space well justified.

(6) Ample drill material, particularly on the more difficult combinations, required by the calculated frequency with which the basic combinations must occur in the experience of the child if he is really to learn and to hold them. This book actually contains the drill necessary to accomplish the teaching job, without the customary supplementing that must be made by the teacher from other sources.

II. Special material for recognizing individual differences and provision for optional work. (1) Frequent units of "extra problems" and organized lessons for "good workers." All authorities agree that it is high time for competent writers to begin giving systematic consideration to superior children in the public school.

(2) A carefully planned review of the work taught in the second grade in many schools. The first three chapters (totaling nearly 80 pages), devoted to this review, are of course optional.

(3) Various units of work as alternative to certain other units as a means of meeting the needs of special pupils, groups, or classes. Again, classroom experimentation has shown this aspect of the treatment to be a highly remunerative teaching aid.

(4) Self-Help Practice Lessons to aid in training pupils in good habits of using their book as a learning tool under self-guidance.

III. Mechanical demands. (1) Considerable space devoted to making clear the organization of the material, both to teachers and pupils. Chapter headings (showing large units of the work), centered section topics (exhibiting the larger sub-units of each chapter), and numbered article titles (indicating the arithmetical substance of the lesson under study at the moment) combine to make clear the mathematical "flow" of the text. To these are

added parenthetical suggestions for each article, that indicate the authors' advice to teachers concerning the most effective way of handling these units.

(2) Summaries at the ends of chapters, that provide convenient and definite means for a quick test-survey of the progress made by the pupil.

(3) An unusual amount of space devoted to pictorial and diagrammatic aids to understanding.

The foregoing list of space requirements indicates the inherent necessity of more generous texts in arithmetic than have customarily been provided.

Experimental use of this material in a large number of third-grade classes widely scattered over the country has demonstrated that expansive treatment takes not more but **less** time than the customary condensed text material. The average third-grade class, as a matter of fact, normally uses as many pages of material as this book contains, taking about 150 pages from its adopted text and getting the rest as supplementary material from sources that are frequently ill-fitted to the text. This text for class use does not need supplementing. The authors would lay heavy stress on the fact that, while expansive treatment increases bulk, it **increases** also the **rate of progress;** and it **decreases** both the **difficulties** and the **failures.**

The authors' acknowledgments are herewith made to the administrators and teachers, unnamed here only because their number runs into hundreds, who so generously aided in passing this material through the refining fires of classroom experimentation, thereby assisting in bringing it to the final form. Special acknowledgment is due Misses Tolosa Cooke, Ruth Pritchard, and Celia Sheldon for valuable assistance in connection with various units of the work.

The Authors.

CONTENTS

PART ONE

CHAPTER I

BEGINNING WORK IN ADDITION. UNITED STATES MONEY

PAGE

Easy Counting ... 1
Addition with Sums to Ten ... 3
New Words and Signs ... 7
Addition with Sums 11 to 18 ... 14
United States Money ... 18
Summary ... 19

CHAPTER II

BASIC SUBTRACTION FACTS

Finding How Many Are Left ... 21
Finding How Many More Are Needed ... 24
Finding Differences ... 25
Review of Words Used in Arithmetic ... 29
Minuends Less Than 10 (No Zero Difficulties) ... 30
Subtraction with Minuends 10 to 18 ... 32
Subtraction with Zero ... 37
The 100 Subtraction Facts ... 38
Subtraction with Two-Figure Numbers ... 41
Summary ... 46

CHAPTER III

COLUMN ADDITION WITHOUT CARRYING

Column Addition (Sums to Ten) ... 48
Easy Two-Column Addition ... 53
Adding by Endings ... 56
Harder Column Addition ... 60
Neatness in Written Work ... 72
Summary ... 76

CHAPTER IV

CARRYING IN ADDITION. DOLLARS AND CENTS

PAGE
Reading and Writing Numbers (Numbers to 1000) ... 78
How to Use This Book ... 80
Adding Larger Numbers ... 81
Carrying in Adding Larger Numbers ... 83
Problem Analysis ... 86
How to Estimate Answers ... 88
Checking Addition ... 93
Further Study of Carrying in Addition ... 98
Adding Three-Figure Numbers ... 104
Double Carrying in Addition ... 105
United States Money ... 111
Summary ... 116

CHAPTER V

BORROWING OR CARRYING IN SUBTRACTION. CHECKING SUBTRACTION. THE SELF-TESTING DRILLS

Subtracting Dollars and Cents ... 118
Borrowing in Subtraction ... 119
Austrian Method ... 127
Checking Subtraction ... 132
Subtraction with Larger Numbers—Zeros ... 138
Borrowing in Subtraction—No Zeros ... 140
Double Borrowing in Subtraction ... 141
Double Carrying in Subtraction (Austrian Method) ... 144
General Practice in Subtraction ... 147
The Self-Testing Drills ... 152
Self-Testing Drill No. 1 ... 156
Summary ... 157

CHAPTER VI

FIRST STEPS IN MULTIPLICATION. TWO, THREE, ONE, AND ZERO IN MULTIPLICATION

Two in Multiplication ... 159
The Meaning of Times ... 161
Self-Testing Drill No. 2 ... 162
Three in Multiplication ... 164

PAGE
Self-Testing Drill No. 3 168
Problem Analysis 170
One in Multiplication 174
Zero in Multiplication 176
Self-Testing Drill No. 4 177
Multiplicands of More Than One Figure 182
Self-Testing Drill No. 5 184
Summary 187

CHAPTER VII

CARRYING IN MULTIPLICATION. FIVE AND FOUR IN MULTIPLICATION. THE CALENDAR

Carrying in Multiplication 188
Self-Testing Drill No. 6 192
Estimating an Answer 194
The Problem Scales 199
Problem Scale No. 1 200
Self-Testing Drill No. 7 203
Harder Carrying in Multiplication 204
Problem Scale No. 2 208
Self-Testing Drill No. 8 210
Five in Multiplication 214
Problem Scale No. 3 219
Self-Testing Drill No. 9 223
Problem Scale No. 4 224
Four in Multiplication 225
The Calendar 230
Summary 232

PART TWO

CHAPTER VIII

FIRST STEPS IN DIVISION. USE OF INCH, FOOT, AND YARD. EASY FRACTIONS

What It Means to Divide by Two and Three 233
Problem Scale No. 5 236
Word and Sign Used in Division 238
Self-Testing Drill No. 10 242

PAGE
The Inch, the Foot, and the Yard 246
Estimating Answers 252
Problem Scale No. 6 253
Division by Four 254
Self-Testing Drill No. 11 256
Easy Fractions 257
Problem Scale No. 7 263
Self-Testing Drill No. 12 265
Division by Five 266
Self-Testing Drill No. 13 270
Summary 271

CHAPTER IX

SHORT DIVISION WITH CARRYING. LARGER NUMBERS. CHECKING DIVISION. LIQUID MEASURE. POUNDS AND OUNCES. THE DOZEN

Easy Short Division with Larger Numbers 273
Reading and Writing Larger Numbers (Numbers to 10,000) 275
Checking Division 278
Liquid Measure 280
Division with Zero 283
Self-Testing Drill No. 14 284
Problem Study 285
Problem Scale No. 8 286
Short Division with Carrying and Remainders 290
Self-Testing Drill No. 15 292
Problem Scale No. 9 297
Self-Testing Drill No. 16 299
Further Study of Division with Carrying 301
Measures of Weight 303
The Dozen 305
Self-Testing Drill No. 17 306
Problem Scale No. 10 307
Self-Testing Drill No. 18 309
Division with Money 310
Problem Scale No. 11 312
Self-Testing Drill No. 19 314
Summary 317

CHAPTER X

MULTIPLICATION AND DIVISION WITH SIX, SEVEN, EIGHT, AND NINE. TELLING TIME

PAGE

Six in Multiplication ... 319
Estimating Answers ... 322
Problem Scale No. 12 ... 324
Telling Time by the Clock ... 328
Self-Testing Drill No. 20 ... 331
Dividing by Six ... 332
Self-Testing Drill No. 21 ... 334
Seven in Multiplication ... 336
Problem Scale No. 13 ... 339
Self-Testing Drill No. 22 ... 342
Dividing by Seven ... 343
Problem Scale No. 14 ... 346
Eight and Nine in Multiplication ... 348
Self-Testing Drill No. 23 ... 352
Dividing by Eight and Nine ... 353
Self-Testing Drill No. 24 ... 354
Self-Testing Drill No. 25 ... 359
Self-Testing Drill No. 26 ... 361
Summary ... 362

Summary of Third-Grade Work ... 364

Self-Help Practice Lessons ... 368
- The One Hundred Addition Facts ... 368
- The One Hundred Subtraction Facts ... 370
- The One Hundred Multiplication Facts ... 371
- The Ninety Division Facts ... 373

Tables of Measure ... 375

Pupil's Score Cards ... 377

Index ... 383

THIRD-GRADE ARITHMETIC

PART ONE

CHAPTER I

BEGINNING WORK IN ADDITION. UNITED STATES MONEY

EASY COUNTING

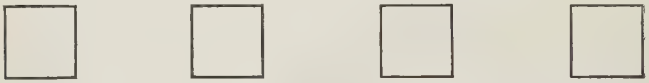
1. Counting. (Class Work.) Do you know that the pupils who learn to read well are the ones who do the best work in arithmetic? See if this is true as you take turns in reading and answering the questions on this page and the next.

1. How many squirrels do you see in the picture?
2. How many robins? How many pigeons?
3. Count all of the birds. How many are there?
4. How many trees with white bark are there?
5. How many birds are in the big tree?
6. How many words are in question 1 above?
7. How many parts has question 2 above?
8. Count by ones until your teacher says, "Stop!"

Then ask another pupil to count until the teacher again says, "Stop!" Go on until 100 is reached.

9. How many children are in your room today?

10. Go to the blackboard and make nine squares like these. Number each square.



11. What is the third word in question 9?

12. Read the sixth word in the ninth question.

13. How many parts are there in question 14?

14. What is the next number after seven? What is the next number after nine? After 36? After 67? After 89?

15. What is the number just before five? What number is just before ten? Just before 40? Just before 80?

16. What number comes between three and five? Between eight and ten? Between 17 and 19?

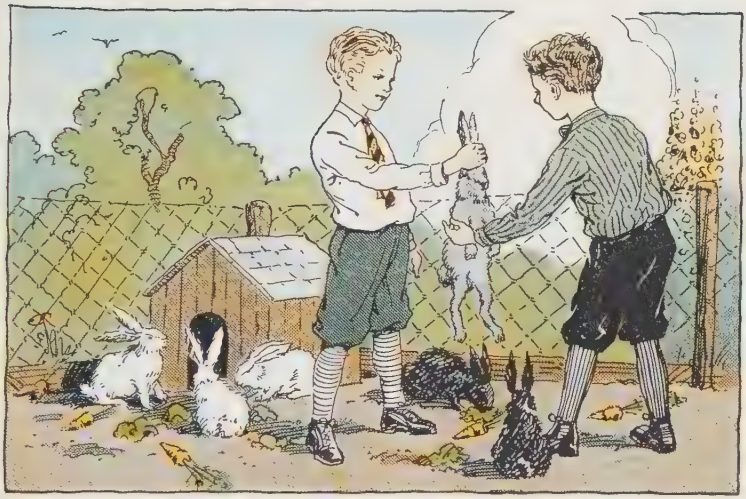
17. Which is the smaller: 63 or 57? 82 or 78? 57 or 75? 32 or 23? 15 or 51?

18. Which is larger: sixty or seventy? 90 or 80? 40 or 30?

19. Which is nearer 100: 69 or 81?

20. Which is nearer 1: 37 or 65?

21. Choose a pupil to go to the blackboard and write numbers. Begin with 1 and write until the teacher says, "Stop!"



ADDITION WITH SUMS TO TEN

2. Harry and His Rabbits. (Class Work.) Answer the questions about Harry and his rabbits.

1. Harry had 3 white rabbits and 2 black rabbits. How many rabbits had he? 3 and 2 are how many?

2. A friend gave him a gray rabbit. How many rabbits did he have then? 5 and 1 are how many?

3. One morning Harry fed his rabbits five heads of lettuce, and in the afternoon he gave them 3 more. How many heads of lettuce did he feed them that day? 5 and 3 are how many?

4. Harry spent 5 cents one day and 2 cents the next day for carrots to feed the rabbits. How much did he spend for carrots? 5 and 2 are how many?

3. Adding from Pictures. (CLASS WORK.) Tell what numbers belong where the blanks are.

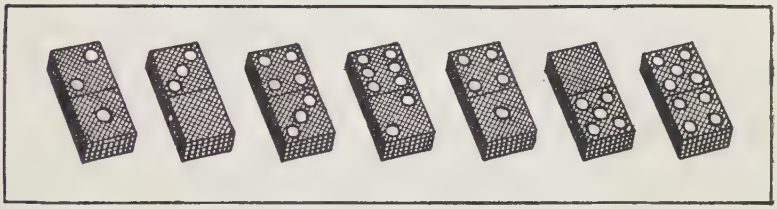
1. 2 ships and 2 ships are ..... ships.

2. 4 birds and 3 birds are ..... birds.
4 and 3 are .....

3. 3 fish and 5 fish are ..... fish.
3 and 5 are .....

4. 2 girls and 4 girls are ..... girls.
2 and 4 are .....

4. Grouping and Adding Dots. (A SILENT READING LESSON.) Here are the pictures of seven dominoes. A letter is printed under each one. Study the questions below the picture and be ready to give the correct answer to each one. Work fast, but be sure that you read carefully.



(*A*) (*B*) (*C*) (*D*) (*E*) (*F*) (*G*)

1. How many dots are on domino *A*?

2. How many dots are on domino *B*?

3. Now look out or you will miss this one. How many dots are on *A* **and** *B*?

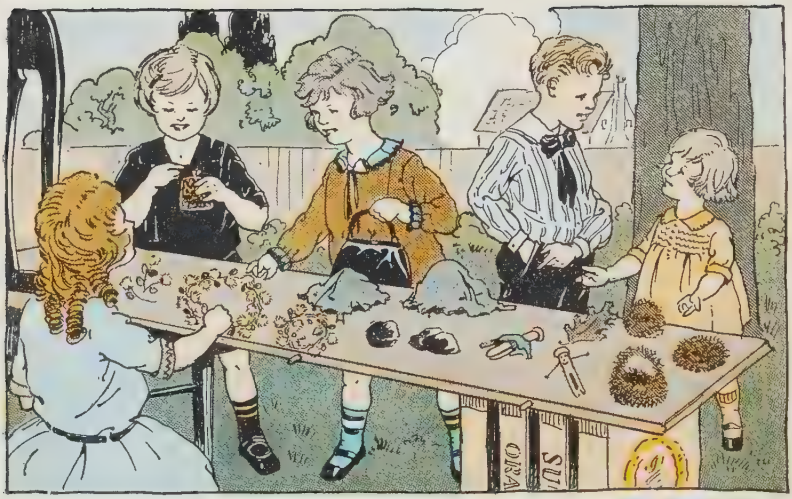
4. How many dots are on *C*?

The next question has four parts. The teacher may call on you to answer any one of the four parts of the question.

5. How many dots are on *D*? On *E*? On both *B* and *F*? On *G*?

6. How many dots are on the lower half of *A* and the upper half of *B* together?

7. How many dots are on the upper half of *C* and the upper half of *E* together?



5. Playing Store. (CLASS WORK.) One day Marie and Jennie had a store. These are some of the things they sold:

Hats made of pieplant leaves	3 pins each
Burdock flower baskets	2 pins each
Clothespin dolls	5 pins each
Mud cakes with brick frosting	2 pins each
Bracelets made of clover flowers	1 pin each
Clover flowers	3 for 1 pin
Chains made from pink and white clovers	4 pins each

PROBLEMS

1. How many clover flowers did Nell buy for 1 pin?

2. What did Helen pay for 2 mud cakes?

3. Marjorie bought a clothespin doll and a basket. How many pins did she pay?

4. What did Mabel pay for a hat and a bracelet?

5. Clara bought a chain and a doll. How many pins did she pay?

6. What did two baskets cost?

7. What did a hat and a chain cost?

8. What did a cake and three clover flowers cost?

9. What did a doll and a bracelet cost?

6. New Words and Signs. (A SILENT READING LESSON.) Have you found that the pupils who read carefully do the best work in arithmetic? If you have, you will want to read this lesson very carefully. It will tell you how to use some new words and signs. You will use these new words and signs nearly every day in your arithmetic work.

You know that 3 and 2 are 5. When we find that 3 and 2 are the same as 5, we say we **add** 3 and 2.

You know that 5 and 1 are 6. We **add** 5 and 1 to get 6.

If you **add** 5 and 1, 6 is the answer. The word **sum** is another name for the answer you get when you **add.**

When you add numbers, you find **one number** that is just as much as the numbers to be added. To **add** 2 and 2 means to find a number which is just as much as 2 and 2.

The **sum** of 2 and 2 is 4.

1. Add 3 and 1. What is the sum?

2. What is the sum of 1 and 8?

To *find the sum* of numbers means the same as to add them.

Find the sum of:

3. 1 and 2	**7.** 4 and 2	**11.** 6 and 2
4. 2 and 3	**8.** 1 and 4	**12.** 2 and 4
5. 3 and 4	**9.** 3 and 3	**13.** 7 and 2
6. 1 and 5	**10.** 2 and 5	**14.** 8 and 1

Do you see in the addition examples above that the word "and" is used to mean **add?**

There is a little sign made of two short lines to show that numbers are to be added. It will save time to use this sign. This is how it looks: +. It is called the addition sign or the **plus** sign. **Plus** also means to add.

15. Write on your paper: 3 and 2 are 5. Now write: 3+2 is 5. Which of these two ways is the quicker?

16. Do you think that it saves time to use the plus sign?

There is another way to save time in writing an addition example. Would you like to know how to save time this way? If so, read the lines below.

You have just written this on your paper: 3+2 is 5.

Two short lines written like this, =, may be used instead of the word "is." = is called the **equals** sign and means "is" or "equals" and "are" or "equal."

17. Write 3+2 equals 5 on a piece of paper.

18. Write 3+2 = 5.

19. Would you rather use the sign = than to write the words "is" or "equals" or "are" or "equal"? Why?

To "add" means to find one number which is just as much as all the numbers to be added.

"Sum" is the name of the answer in addition.

+ means "and" or "plus." It is the plus or addition sign.

= means "are" or "equal" and "is" or "equals." It is called the "equals" sign.

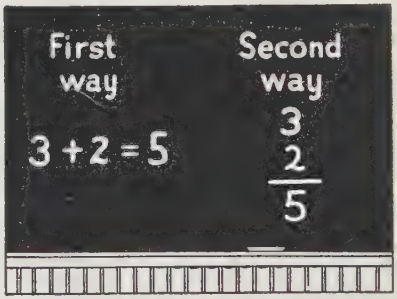
7. Using the New Words and Signs. (ORAL WORK.) Give the answers to the examples below. Watch the new words and signs.

EXERCISE

1. 7 plus 1=	9. 5 plus 5 equals	17. 6+4=
2. 1+1=	10. 6 and 3 equal	18. 4+4=
3. 5 and 4 are	11. 8+2 is	19. 6+1=
4. 2 and 6=	12. 3+6=	20. 7 and 3=
5. 4+5=	13. 4 and 6 equal	21. 1 and 7=
6. 1 plus 6=	14. 2+1=	22. 5 plus 3=
7. 3+7=	15. 1 plus 3=	23. 9+1=
8. 1 and 9 are	16. 2+8=	24. 2 and 7=

If you are careful in watching words and signs, you will do better work in arithmetic.

8. Another Way of Writing Addition. (CLASS WORK.) There are two ways of writing numbers which you are to add. Find the two ways in the picture of the blackboard below.



When you write numbers the second way, you write them in a **column.** "Column" is a new word. Can you write numbers in straight columns? Try it with the addition examples below. When you have written them in columns, find their sums. Work quickly. Learn to save time, but do neat work.

After you have done this, your teacher may ask a pupil to put his work on the blackboard so that you can see if he knows how to write numbers in columns and add them.

1. $3+1=$	3. $1+7=$	5. $3+7=$	7. $2+7=$
2. $4+5=$	4. $2+8=$	6. $1+6=$	8. $1+9=$

9. A Game in Matching Addition Examples. (CLASS WORK.) On the next page you will find two columns of numbers. Look at the column which has (*A*) printed at the top. Then look at the column with (*B*) at the top.

1. What is the first example in Column (*A*)?
2. What is the first example in Column (*B*)?
3. Does the sum of 4 and 2 equal the sum of 2 and 4?

Look at each example in Column (*A*). Then look at the example in the same row in Column (*B*) and see if its sum equals the one in Column (*A*).

When the teacher calls your name and gives you the number of the examples you are to look at, say "Yes" if the sums are equal and "No" if the sums are not equal.

	Column (A)	*Column (B)*
1.	4 and 2	2 and 4 yes
2.	5+2	2+5 ?
3.	7 and 1	2 and 7 ?
4.	4+3	3+5 ?
5.	3 and 6	6 and 3 ?
6.	5+5	5+4 ?
7.	8 and 1	1 and 8 ?
8.	3+2	3+4 ?
9.	3 and 4	4 and 3 ?
10.	2+7	7+2 ?
11.	6 and 4	4 and 6 ?
12.	3+5	5+2 ?
13.	8 and 2	2 and 8 ?
14.	6+3	3+6 ?
15.	4 and 5	5 and 3 ?
16.	7+3	3+7 ?
17.	2 and 4	4 and 3 ?
18.	6+2	2+6 ?

10. Practice in Adding with Sums 10 or Less. (RAPID ORAL PRACTICE.) Give the sums of the following examples. "Give the sums" means the same thing as "add the numbers." Practice until you can give all of the sums without making a mistake.

These examples are arranged in rows, and each row is numbered. How many rows are there? How many examples are there in each row?

Take turns in giving the sums for each row. Watch carefully while other pupils are trying. If a mistake is made, put up your hand.

Row 1.	3	1	2	1	2	1	2	1	2
	2	4	1	3	2	1	5	2	3
Row 2.	1	2	1	2	3	1	2	4	1
	5	4	6	7	1	7	8	1	8
Row 3.	4	1	3	5	4	3	2	6	5
	2	9	3	1	3	5	6	1	2
Row 4.	7	6	5	3	8	7	6	4	9
	1	2	3	4	1	2	3	4	1
Row 5.	8	5	5	3	4	7	3	4	6
	2	4	5	7	6	3	6	5	4

☛If you cannot give all the sums quickly, turn to page 368 and practice on the addition facts at home and at other times in school.

11. Words and Figures in Arithmetic. (SILENT READING.) There are different ways of writing numbers. Sometimes they are written in **words,** and sometimes in **figures.** "Figure" is a new word. Try to find out from this lesson what it means.

1. **Three** is a word.	**3** is a figure.
2. **Four** is a word.	**4** is a figure.
3. **Six** is a word.	**6** is a figure.
4. **Nine** is a word.	**9** is a figure.

Some numbers are written with only one figure. Numbers like 3, 4, 6, and 9 are **one-figure** numbers. But other numbers have more than one figure in them.

5. **Twenty-seven** is a word. 27 is a **two-figure** number.

6. Is 36 a one-figure or a two-figure number?

7. Is 8 a two-figure number?

8. How many figures are needed to write the number eight?

9. How many figures are needed to write the number eighteen?

10. There are two figures in 47. They are 4 and 7.

11. There are two figures in 19. Can you tell what they are?

12. Name the figures in 34. In 56. In 28.

Write on your paper the figures that belong in the blanks below. Look at Example 13. It shows how to write the correct figure.

Your teacher may ask you to write these figures on the blackboard.

13.	**14.**	**15.**	**16.**	**17.**
two	five	one	eight	seven
2	----------	----------	----------	----------
18.	**19.**	**20.**	**21.**	**22.**
fourteen	eleven	six	twenty-two	thirteen
----------	----------	----------	----------	----------

ADDITION WITH SUMS 11 TO 18

12. Harder Addition. (Oral Practice.) Can you give the answers to the 36 examples in this lesson? Try them and see.

If you can't tell the sums quickly, turn to page 369 and practice. Then try this lesson again. Notice that these examples are printed in column form.

EXERCISE

Give the sums:

1.	8	9	4	9	9	9	6	6	5
	9	7	7	9	8	2	5	9	8
2.	9	6	4	5	8	7	4	3	8
	6	8	8	9	4	8	9	8	8

3.	8	7	7	8	9	9	7	7	5
	6	7	6	3	5	3	9	4	7
4.	9	6	8	6	3	8	2	7	5
	4	6	5	7	9	7	9	5	6

13. Zero in Addition. (Class Work.) There are only ten figures used in arithmetic. Here they are.

0 1 2 3 4 5 6 7 8 9

Do you know the name of the first one? It is called **zero.** It means not any at all. If you add **zero** to 5, that is the same as adding **nothing** to 5. The sum is 5. 5 and 0 are 5. 0 and 9 are 9. 18 and 0 are 18.

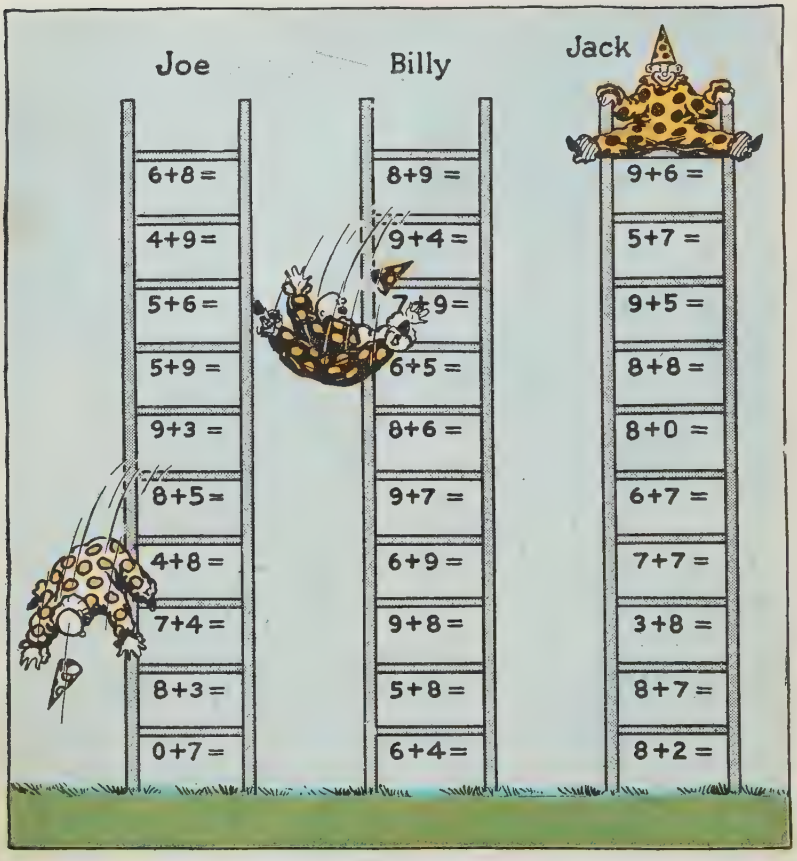
Add and give the sums:

1. 4 and 0 are **3.** 2 and 0 are **5.** 0 and 5 are

2. 3 and 0 are **4.** 1 and 0 are **6.** 0 and 7 are

7.	**8.**	**9.**	**10.**	**11.**	**12.**	**13.**	**14.**	**15.**
8	0	0	1	4	0	9	0	3
0	9	0	0	0	6	0	7	0

14. Ladder Addition Drill. (Oral Drill.) The third-grade children like to see how far they can climb on addition ladders. Joe, Billy, and Jack are three boys who like to race. When a pupil does not know the answer or misses one, the children say he falls off



the ladder. The picture above shows you that Joe fell off at 8+5. When did Billy fall? Jack got to the top and is happy. He knew all the answers and could say them quickly. See if you can climb all of these ladders and do as well as Jack did.

Make ladders on the blackboard and climb them.

15. The 100 Addition Facts. (Quick Oral Practice.) Here and on page 18 are 100 addition facts which you need to know. Give the sums when the teacher calls your name. If you need more practice, turn to pages 368 and 369.

EXERCISE

1.	8	8	8	6	6	9	8	9	9	5
	0	3	8	9	5	3	4	6	9	7
2.	3	6	9	0	5	6	5	2	5	0
	8	7	7	0	0	3	4	5	5	6
3.	6	4	6	0	2	7	3	3	4	3
	8	9	6	8	7	5	5	6	4	0
4.	7	4	9	8	8	5	2	0	2	5
	2	2	0	7	9	9	6	9	4	3
5.	5	9	6	7	5	3	2	0	6	8
	1	1	0	6	8	7	8	2	1	1
6.	5	7	4	7	3	7	0	4	4	8
	2	7	8	9	1	0	7	3	1	2
7.	8	1	4	0	1	9	4	6	9	7
	6	2	0	3	8	2	6	2	8	8

8.	1	7	8	0	0	2	5	9	3	9
	0	1	5	5	1	0	6	4	9	5
9.	7	1	1	7	2	1	4	0	1	2
	4	4	9	3	9	7	7	4	1	1
10.	2	3	3	1	2	1	3	6	4	1
	2	2	3	3	3	6	4	4	5	5

UNITED STATES MONEY

16. The Cent, Nickel, and Dime. (A SILENT READING LESSON.) Below are shown pictures of money. We call these **coins.** Study carefully and be ready to give the answers to the questions below the picture.

Cent	Nickel (5 cents)	Dime (10 cents)	Quarter (25 cents)

(*A*) (*B*) (*C*) (*D*)

1. What letter is under the coin worth 1 cent?
2. Name some things that you can buy for 1 cent.
3. What is another name sometimes used for cent?
4. What letter is under the coin worth 5 cents?

5. What can you buy for five cents?
6. What is the name of the coin worth 5 cents?
7. What letter is under the coin worth 10 cents?
8. What is the name of the coin worth 10 cents?
9. Name some things you can buy for 10 cents.

1 nickel = 5 cents.
1 dime = 2 nickels, or 10 cents.
1 quarter = 25 cents.
¢ means cent or cents.

10. How many cents are there in one dime?
11. How much are one nickel and two cents?
12. How many cents are $4¢ + 3¢$?
13. What is the name of the coin worth 25 cents?

SUMMARY

17. General Review. (Written Work.) If you cannot give the sums of the 100 addition facts quickly and without a mistake, turn to pages 17 and 18, and practice on them a little each day until you can.

Write the numbers 1 to 23 on your paper and then write after them the answers to the questions and examples on this page and the next. This is how the first one should look on your paper: 1. *Yes.*

1. Is 9 a larger number than 6?
2. Is 9 a larger number than 11?
3. Is 13 a smaller number than 11?

4. What does this sign (+) mean?

5. What does this sign (=) mean?

6. What is the answer when you add 8 and 3?

7. What is the sum of six and seven?

8. Write the sign that means **add.**

9. Write 8 and 4 in a column and add them.

10. What sign means "are" or "equal?"

11. What number belongs where the blank is in this example: 5+3=.....?

12. Does 3+6 equal 6+2?

13. Is 4+3 larger than 2+4?

14. Write the figures for the number thirty-four.

15. Write the figures for the number forty.

16. What is the sum of zero and seven?

17. Is 7¢ more than five cents?

18. Is a nickel more than 8¢?

19. Is a dime more than 3¢+6¢?

20. What does the word **plus** mean?

21. Write a two-figure number.

22. Does 4+7 equal 7+4?

23. Name a coin that is worth less than a dime and more than a cent.

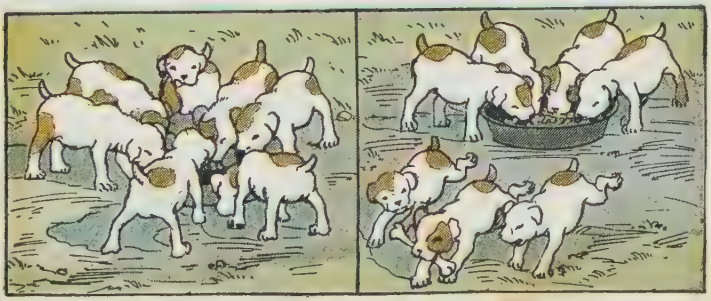
CHAPTER II

BASIC SUBTRACTION FACTS

FIRST WORK IN SUBTRACTION.

18. Finding How Many Are Left. (CLASS WORK.) Look at the pictures on this page and the next and give the answers to the questions that follow the pictures.

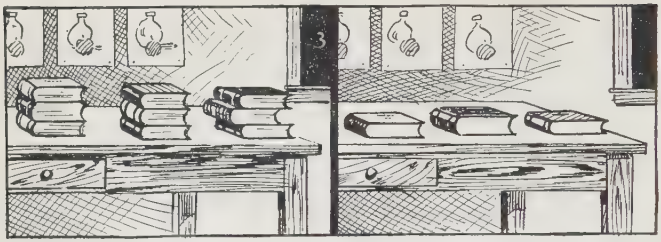
Read carefully. Remember that good readers can do well in arithmetic. Are you going to show that you can be a good reader if you want to be one?



(*A*) (*B*)

1. A boy's seven puppies were eating from a pan. (Look at picture *A*.) Three of the puppies ran away. (Look at picture *B*.) How many puppies were left at the pan?

2. 3 from 7 is how many?



(*C*) (*D*)

3. There were nine books on a table in a third-grade room. (Look at picture *C*.) The children took six of them to their desks to read. How many were left on the table? (See picture *D*.)

4. 6 from 9 is how many?

5. Clara had five doll dresses. She gave two of them to Sara. How many dresses did Clara have left?

6. 2 from 5 is how many?

7. Robert had 6 cents and spent 2 cents. How many cents did he have left?

8. Jack had 9 marbles in his pocket. Before going to school, he took 4 of his marbles out of his pocket and put them into a box at home. How many marbles were left in his pocket?

9. How many are left when you take 4 from 9?

10. How many are left when you take 3 from 6?

Give the answers to these examples:

11. 4 from 8

12. 8 less 4

13. Take 4 from 8

14. 7 less 2

15. Take 2 away from 8

16. 4 less 2

17. 4 from 6

18. 7 less 5

We use the word *subtract* to mean "take away." When one number is taken from another number, we find how many are left by *subtracting*.

Read these examples and give the answers:

19. 1 subtracted from 9

20. 3 subtracted from 5

21. 9, take away 3. What is left?

22. 7, take away 6. What is left?

23. Take 2 from 7

24. 5 subtracted from 8

25. 4 from 7

26. 8, take away 3. What is left?

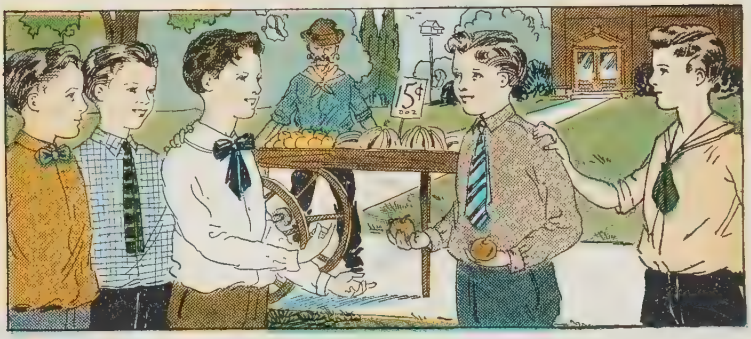
27. 9 less 5

28. 3 subtracted from 5

29. Take 6 from 8

30. 2 from 9

31. 7 subtracted from 9



19. Finding How Many More Are Needed. (CLASS WORK.) Look at the picture and then answer the questions.

1. How many boys do you see in the picture?

2. Fred has two apples. How many more must he get so that each boy in the picture may have one?

3. 2 and how many more are 5?

4. Jennie was on a vacation and wanted to send eight post cards to her friends. She bought the cards, but she had only three stamps. How many more stamps did she need?

5. 3 and how many more are 8?

6. Harold wanted to buy a top that cost seven cents. He had only four cents. How many more cents did he need?

7. 4 and how many more are 7?

8. 3 and how many more are 6?

9. 4 and how many more are 9?

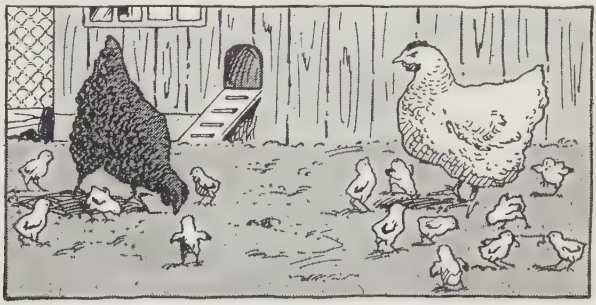
10. 5 and how many more are 8?

11. To find how many more 8 is than 2, subtract 2 from 8. What is the answer?

12. To find out how many more 6 is than 4, subtract 4 from 6. What is the answer?

> **We subtract numbers when we have one number and want to find how many more we need to equal another number.**

20. Finding Differences. (CLASS WORK.) Try to answer all ten questions on this page and page 26.



Mrs. Black Top **Mrs. Lady Jane**

1. How many chickens are with Mrs. Black Top?

2. How many chickens are with Mrs. Lady Jane?

3. How many more chickens are with Mrs. Lady Jane than are with Mrs. Black Top?

4. 9 is how many more than 5?

5. Mary has 6 cents and her sister has 4 cents. How many more cents has Mary than her sister?

6. How many more is 6 than 4?

7. John made 5 runs in a ball game, and James made 3 runs. How many more runs did John make?

8. 5 is how many more than 3?

9. 8 is how many more than 2? The answer is 6.

This question may be asked in another way, thus: What is the **difference** of 8 and 2? The **difference,** 6, is the answer.

"What is the difference?" means "How many more or less?" or "How much larger or smaller?"

10. What is the difference of 7 and 9?

When you subtract one number from another number, you find the difference of the numbers.

21. Review of Subtraction Ideas. (A Silent Reading Lesson.) You have learned that there are three uses of subtraction. These are:

1. To find what is left, as in the question: I had 9 marbles and lost 6. How many have I left?

2. To find how many more are needed, as in the problem: I have 6 cents and need 9. How many more cents do I need?

3. To find the difference of two numbers, as in the

problem: I have 9 apples; John has 6. What is the difference of 9 and 6?

Whenever you need to do any one of these things, you should subtract.

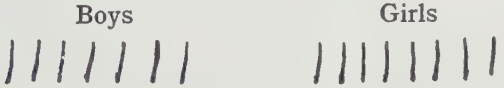
☛ The answer in a subtraction example has its own name. The name is the **difference.** You will need to know what **difference** means in arithmetic; so be sure to remember it.

22. Problems in Addition and Subtraction. (WRITTEN WORK.) Before you try to get the answers to these problems, be sure you know whether you are to add or subtract.

1. The third-grade children of Whittier School went on a bird hike. They saw two chickadees, two downy woodpeckers, and five robins.

(*a*) How many birds did they see?
(*b*) How many different kinds of birds did they see?

2. The boys played an addition game with the girls in the third grade. They kept their scores in this way:



Whose was the higher score, the boys' or the girls'?

3. Marbles cost five cents for three. Frank had eight marbles and bought five cents' worth. How many did he then have?

4. Sam's grandmother lived six blocks from his home. He often went there on his roller skates. How many blocks did he skate, going there and coming back home?

5. The children of the third grade had eight goldfish. Two of them died. How many were left?

6. Helen sent 8 invitations for her birthday party. Five girls came to the party. How many of the girls who were invited did not come?

7. Jim had to work 9 arithmetic examples. He finished 5. How many more did he have to do?

EXTRA PROBLEMS FOR GOOD WORKERS

8. Alice and Paul went to the circus with their father. They saw five elephants, two camels, three lions, a leopard, and two giraffes.

(*a*) How many different kinds of animals did they see?

(*b*) How many animals did they see in all?

9. Paul spent 5 cents for peanuts to feed the elephants, 5 cents for popcorn, and 10 cents for a balloon. How much money did he spend?

10. The tickets for a merry-go-round were ten cents each. How much did it cost for Alice, Paul, and their father to ride on the merry-go-round?

23. Review of Words Used in Arithmetic. (WRITTEN WORK.) It will be fun to see if you can remember the new arithmetic words you have learned. Study this page carefully. Try to give the answers without making a mistake.

1. Is 39 smaller or larger than 41?

2. Add five and two.

3. The answer in addition is called the .....

4. Write the plus sign.

5. Show how you can save time in writing this example: three and one are four.

6. Why is it a good plan to use signs?

7. Write 6 and 3 in a column and find the sum.

8. Write the figure for the word seven.

9. If you add zero to 6, what is the sum?

10. Subtract one from four.

11. To find the sum of two numbers you .....

12. When you take one number away from another number, you.....

13. The answer in subtraction is the .....

14. To find the difference of two numbers you.....

15. When you have one number and want to know how many more you need to make another number, you .....

MINUENDS LESS THAN 10. (No Zero Difficulties)

24. Getting Ready to Use the 36 Easy Subtraction Facts. (ORAL PRACTICE.) Give the numbers that belong on the blanks on this page and the next. See if you can answer every example correctly the first time.

EXERCISE 1

Give the differences:

	(*A*)	(*B*)	(*C*)
1.	1 from 2 is.....	2 from 3 is.....	2 from 4 is.....
2.	1 from 3 is.....	3 from 4 is.....	1 from 5 is.....
3.	1 from 4 is.....	4 from 5 is.....	3 from 5 is.....
4.	3 from 6 is.....	2 from 5 is.....	5 from 6 is.....
5.	1 from 6 is.....	4 from 6 is.....	2 from 6 is.....
6.	6 from 7 is.....	6 from 8 is.....	3 from 7 is.....
7.	1 from 7 is.....	3 from 8 is.....	5 from 7 is.....
8.	7 from 8 is.....	4 from 7 is.....	8 from 9 is.....
9.	1 from 8 is.....	5 from 8 is.....	6 from 9 is.....
10.	4 from 8 is.....	1 from 9 is.....	7 from 9 is.....
11.	2 from 7 is.....	4 from 9 is.....	3 from 9 is.....
12.	2 from 9 is.....	2 from 8 is.....	5 from 9 is.....

EXERCISE 2

	(*A*)	(*B*)	(*C*)
1.	1 and.....are 2	2 and.....are 3	2 and.....are 4
2.	1 and.....are 3	3 and.....are 4	1 and.....are 5
3.	1 and.....are 4	4 and.....are 5	3 and.....are 5
4.	3 and.....are 6	2 and.....are 5	5 and.....are 6
5.	1 and.....are 6	4 and.....are 6	2 and.....are 6
6.	6 and.....are 7	6 and.....are 8	3 and.....are 7

	(*A*)	(*B*)	(*C*)
7.	1 and.....are 7	3 and.....are 8	5 and.....are 7
8.	7 and.....are 8	4 and.....are 7	8 and.....are 9
9.	1 and.....are 8	5 and.....are 8	6 and.....are 9
10.	4 and.....are 8	1 and.....are 9	7 and.....are 9
11.	2 and.....are 7	4 and.....are 9	3 and.....are 9
12.	2 and.....are 9	2 and.....are 8	5 and.....are 9

25. Practice on the 36 Easy Subtraction Facts. (ORAL WORK.) You have learned that numbers to be added may be written in different ways. This is true of subtraction examples, also.

EXAMPLE. If you had 6 cents and spent 2 cents, how many cents would you have left?

To subtract, put the smaller number under the larger one like this: ⟶

$$\begin{array}{r} 6¢ \\ 2¢ \\ \hline 4¢ \end{array}$$

and then subtract. The answer is 4 cents.

Subtract and give the differences in the examples in the four rows on this page and the next. Watch to see if any mistakes are made.

If you cannot give the answers quickly, turn to page 370, and practice until you can.

EXERCISE

1.	2	3	4	3	4	5	4	5	5
	1	1	2	2	1	4	3	1	2

2.	6	5	6	6	6	6	7	8	7
	3	3	1	5	2	4	1	2	3
3.	7	8	7	8	7	9	8	8	9
	6	5	2	1	4	1	7	6	3
4.	8	9	9	9	7	9	9	8	9
	4	6	8	2	5	5	7	3	4

SUBTRACTION WITH MINUENDS 10 TO 18

26. Getting Ready to Use the 45 Harder Subtraction Facts. (ORAL WORK.) Give the numbers that belong on the blanks.

EXERCISE 1

	(*A*)	(*B*)	(*C*)
1.	8 from 10 is.....	2 from 11 is.....	8 from 14 is.....
2.	4 from 12 is.....	9 from 10 is.....	7 from 14 is.....
3.	1 from 10 is.....	5 from 12 is.....	5 from 10 is.....
4.	6 from 12 is.....	2 from 10 is.....	6 from 13 is.....
5.	7 from 10 is.....	6 from 11 is.....	3 from 10 is.....
6.	5 from 11 is.....	9 from 14 is.....	3 from 11 is.....
7.	7 from 15 is.....	7 from 12 is.....	9 from 13 is.....
8.	4 from 11 is.....	8 from 15 is.....	8 from 12 is.....
9.	7 from 13 is.....	9 from 18 is.....	6 from 15 is.....
10.	3 from 12 is.....	6 from 10 is.....	5 from 13 is.....
11.	8 from 16 is.....	9 from 11 is.....	6 from 14 is.....
12.	9 from 12 is.....	9 from 16 is.....	8 from 17 is.....

	(*A*)	(*B*)	(*C*)
13.	5 from 14 is.....	9 from 15 is.....	4 from 10 is.....
14.	8 from 11 is.....	8 from 13 is.....	7 from 11 is.....
15.	9 from 17 is.....	7 from 16 is.....	4 from 13 is.....

EXERCISE 2

	(*A*)	(*B*)	(*C*)
1.	8 and....are 10	2 and....are 11	8 and....are 14
2.	4 and....are 12	9 and....are 10	7 and....are 14
3.	1 and....are 10	5 and....are 12	5 and....are 10
4.	6 and....are 12	2 and....are 10	6 and....are 13
5.	7 and....are 10	6 and....are 11	3 and....are 10
6.	5 and....are 11	9 and....are 14	8 and....are 12
7.	7 and....are 15	7 and....are 12	3 and....are 11
8.	4 and....are 11	8 and....are 15	9 and....are 13
9.	7 and....are 13	9 and....are 18	6 and....are 15
10.	3 and....are 12	6 and....are 10	5 and....are 13
11.	8 and....are 16	9 and....are 11	6 and....are 14
12.	9 and....are 12	9 and....are 16	8 and....are 17
13.	5 and....are 14	9 and....are 15	4 and....are 10
14.	8 and....are 11	8 and....are 13	7 and....are 11
15.	9 and....are 17	7 and....are 16	4 and....are 13

Remember These Things:

1. Arithmetic is like a game. You must understand the directions, or rules, and then practice.

2. You will understand the rules better and will know what to do if you read carefully.

3. A little practice every day will help you to win.

27. Practice on the 45 Harder Subtraction Facts. (ORAL WORK.) Subtract and give the answers to the examples in the exercise below. This is to be quick work. Watch for mistakes.

For extra practice, turn to pages 370 and 371.

EXERCISE

1.	10	11	12	10	14	10	12	14	10
	8	2	4	9	7	1	5	8	5
2.	12	10	13	10	11	10	11	14	11
	6	2	6	7	6	3	5	9	3
3.	15	12	13	11	15	12	13	18	15
	7	7	9	4	8	8	7	9	6
4.	12	10	13	16	11	14	12	16	17
	3	6	5	8	9	6	9	9	8
5.	14	15	10	11	13	11	17	16	13
	5	9	4	8	8	7	9	7	4

28. Practice with Different Forms of Subtraction. (ORAL WORK.) Here are three ways of writing the same thing.

2 from 4 = 2	and	4 less 2 = 2	mean	4 − 2 = 2

The short line between two numbers means subtract.
4−2=2 8−4=4 9−6=3.

EXERCISE

Give the differences (answers):

(*A*) **1.** 2 from 7 **4.** 8−6 **7.** 17 less 9

2. 1 from 2 **5.** 4 from 12 **8.** 14 less 8

3. 1 from 5 **6.** 10−8 **9.** 13−5

(*B*) **10.** What must be added to 2 to make 7?

11. What must be added to 4 to make 10?

12. What must be added to 1 to make 6?

13. What must be added to 5 to make 11?

14. What must be added to 6 to make 12?

15. What must be added to 9 to make 11?

(*C*) **16.** What must be added to 5 to make 12?

17. What must be added to 6 to make 13?

18. What is the difference of 9 and 2?

19. What is the difference of 3 and 7?

20. What is the difference of 1 and 4?

21. What is the difference of 9 and 8?

22. What is the difference of 7 and 14?

23. What is the difference of 7 and 12?

29. Addition and Subtraction Drill. (ORAL PRACTICE.) Watch for the signs in the examples below. Where you see the sign + you should **add,** and where you see the sign − you should **subtract.**

> **− is the "minus" sign. It means (*a*) "less" or (*b*) "subtract" or (*c*) "take away."**

EXERCISE

Give the answers:

1.	2.	3.	4.
3 girls	8 boys	7 apples	6 roses
+8 girls	+9 boys	+8 apples	+9 roses
girls		apples	roses
5.	**6.**	**7.**	**8.**
18 pins	14 birds	15 chickens	15 hens
−9 pins	−8 birds	−9 chickens	−7 hens
pins	birds	chickens	
9.	**10.**	**11.**	**12.**
16 pencils	4 cows	15 cups	16 horses
−9 pencils	+7 cows	−8 cups	−7 horses
pencils		cups	horses
13.	**14.**	**15.**	**16.**
15 flags	10 bells	13 hats	13 marbles
−6 flags	−7 bells	−8 hats	−9 marbles
flags		hats	marbles

SUBTRACTION WITH ZERO

30. Zero in Subtraction. (A SILENT READING LESSON.) You can learn many things from this book without the help of your teacher. When you come to a Silent Reading Lesson like this one, study it hard; read carefully and try to understand everything in the lesson.

Start in right now to show your teacher that you can study and learn arithmetic by yourself. She will ask you some questions about this lesson later to see if you have really studied.

Subtract:
3
0

You know that 0 is called **zero** and means **not any at all.** What do you think the example at the left means?

It means that you are to subtract or take **nothing** from 3. Do you know what the answer is? It is 3, because if you take zero (or nothing) away from 3, you will have 3 left, won't you?

Do you know the answers to these nine examples?

Subtract:

1.	2.	3.	4.	5.	6.	7.	8.	9.
4	5	1	6	7	8	9	3	2
0	0	0	0	0	0	0	0	0

10. If you had only 4 cents and you spent them all, how many cents would you have left? You wouldn't have any cents left, would you? You might say this

same thing in other ways. Here are two other ways to say it:

(*a*) I would have **no cents** left.
(*b*) I would have **zero cents** left.

You could show it this way. →

Had 4 cents
Spent 4 cents
Left 0 cents

Do you see that if you subtract 4 from 4 the answer is 0?

11. Make up another problem like number 10 and give it to the class. Don't use cents in your problem. Use apples, sticks of candy, or other things.

Can you give the answers to Examples 12 to 20?

Subtract:

12.	13.	14.	15.	16.	17.	18.	19.	20.
0	1	3	2	9	6	5	7	8
0	1	3	2	9	6	5	7	8

31. The 100 Subtraction Facts. (Rapid Oral Drill.) Here are the 100 subtraction facts which you need to learn. Can you say them without making a mistake? If you cannot give the answers quickly, turn to pages 370 and 371 and practice until you can.

EXERCISE

1.	12	13	14	10	11	11	8	2	7	9
	4	6	7	3	6	2	8	0	3	3

2.	9	11	14	18	15	14	12	11	12	7
	1	5	9	9	7	8	5	3	7	1
3.	11	7	12	10	8	4	9	13	8	9
	4	2	8	1	4	1	7	9	2	0
4.	1	9	13	17	15	12	15	2	8	8
	1	2	7	8	8	3	6	1	0	1
5.	13	4	4	6	8	12	17	11	0	3
	5	4	0	2	3	6	9	9	0	2
6.	1	5	9	13	14	9	12	16	10	5
	0	1	4	4	6	9	9	8	5	3
7.	2	16	14	6	3	3	5	6	4	10
	2	7	5	4	0	3	0	1	2	2
8.	10	11	6	6	3	11	5	4	7	7
	4	8	3	0	1	7	2	3	7	4
9.	8	5	8	13	10	16	9	7	5	10
	5	5	6	8	9	9	5	0	4	6
10.	7	10	6	9	7	10	9	6	8	15
	6	7	6	8	5	8	6	5	7	9

32. Mixed Addition and Subtraction Practice. (WRITTEN WORK.) Do you like to take tests? This test will give you a chance to show that you know when to add and when to subtract. Remember to do neat work.

Copy and write the answers:

1.	2.	3.	4.	5.	6.	7.
13	9	14	13	7	17	5
−7	+8	−9	−4	+9	−8	+9

8. Find the sum of 6 and 8.

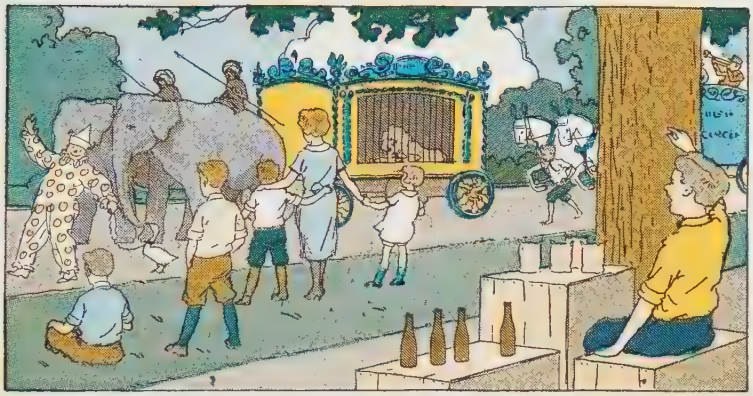
9. What is the difference of 9 and 15?

10.	11.	12.	13.	14.	15.
Add:	*Subtract:*		*Add:*	*Subtract:*	
8	16	15	3	13	7
9	8	−6	9	8	+5

Write these examples and show the signs that belong where the question marks are. This is a question mark: ? Number 16 shows how to do it.

16.		17.	18.	19.	20.
4	4	15	5	14	0
? 7	should be +7	? 8	? 8	? 5	? 8
11	written 11	7	13	9	8

21.	22.	23.	24.	25.	26.	27.
12	6	16	9	9	12	17
? 8	? 7	? 7	? 9	? 7	? 9	? 9
4	13	9	0	16	3	8



SUBTRACTION WITH TWO-FIGURE NUMBERS

33. Learning How to Subtract with Larger Numbers. (WRITTEN WORK.) The problems and questions below will show you how to subtract with larger numbers.

(*A*) HOW MANY ARE LEFT?

1. Tom had a stand and sold popcorn and bottles of pop on circus day. He had 72 bottles of pop one morning. During the day he sold 51 bottles. How many had he left?

72
51
21

To get the answer, you know you must subtract. This is the way to do it:

Write the 72 first. Then write the 51 under it. Subtract just as you always have, writing the 1 under the 1 and the 2 under the 5. Tom had 21 bottles left.

When you want to subtract one number from another, write the larger number first and write the smaller number under it. Then subtract.

2. Tom had 85 paper sacks in the morning. He used 43 that day. How many sacks did he have left? What does the problem ask for?

This is the way to work it:
Write the larger number first.
Write the smaller number under it.

85 Then
43 subtract.

You can do it, can't you? What is the answer, or difference?

3. He asked another boy to take care of his stand in the afternoon while he went around to see some things at the circus. He took 65 cents with him. He spent 30 cents. How much did he bring back?

Subtract: 65¢
30¢

Read the problem again to be sure your answer is the correct one.

(*B*) How Many or How Much More?

4. A boy whose father was a gardener helped get vegetables ready to sell at the market. He pulled radishes and tied them into bunches. His father wanted 48 bunches one day. The boy had tied only 25. How many more bunches did he need?

5. Ruth had 60 cents and wanted to buy a baby doll that cost 89 cents. How much more money did she need?

6. Ruth's mother bought some ribbon for 52 cents and gave the clerk 75 cents. How much change should she have received?

(*C*) What Is the Difference?

7. One toy costs 76 cents. Another costs 32 cents. What is the difference in the cost of these toys?

8. Harry weighs 72 pounds. Dick weighs 87 pounds. What is the difference of their weights?

9. James rode his bicycle 67 miles one week, and Dick rode his 44 miles. What is the difference of the distances the boys rode?

34. Practice in Subtracting Larger Numbers. (Oral and Written Work.) Be sure that you copy the examples in this lesson very carefully; then subtract.

EXERCISE

1.	2.	3.	4.	5.	6.	7.
49	83	57	91	99	86	95
34	22	40	51	28	36	61

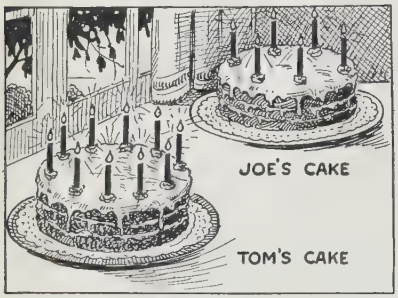
8.		
49	The answer to Example 8 is just 6. You do not need to write the zero. Write the answer this way. ➤➤	49
43		43
06		6

9.	10.	11.	12.	13.	14.	15.
96	88	99	85	76	95	77
75	50	91	10	61	35	42

Watch Examples 16 and 19.

16.	17.	18.	19.	20.	21.	22.
49	39	47	98	70	69	68
7	12	25	3	30	35	45

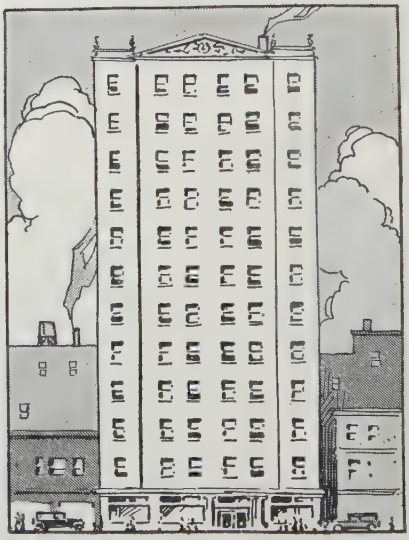
35. Problems in Subtraction. (WRITTEN WORK.) Here are some problems that will show you whether you can subtract larger numbers.



1. Here are pictures of Tom's and Joe's birthday cakes. The candles on each cake show how old the boy is. How much older is Tom than Joe?

2. Jane has 75 cents. If she buys a doll for 25 cents, will she have enough money left to buy a bed that costs 50 cents?

3. How many stories high is the building in the picture? There is one row for each story.



4. Tom's father works on the 5th floor, and Fred's father works on the 9th floor. When Tom and Fred go to their fathers' offices, how many stories higher in the elevator must Fred ride than Tom?

5. One night Carl's mother told him that when he had counted 10 houses with lights in them he could turn on the light in their

own house. When Carl had counted 7 lights, his mother said, "How many more must you count?" What should Carl have said?

6. The pupils in a third-grade class were being weighed at school. Clara, the lightest girl, weighed 41 pounds. Marie, the heaviest girl, weighed 57 pounds. How much more did Marie weigh than Clara?

7. Paul weighed 67 pounds. How much lighter than Paul was Carl, who weighed 46 pounds?

8. How much heavier was Paul than Marie?

9. How much lighter was Clara than Paul?

36. Finding and Correcting Errors in Addition and Subtraction. (A SILENT READING LESSON.) Answers are given to the 15 examples below. Some of these answers are right and some are wrong. Write on your paper the number of each example.

If the answer for the example is correct, put a "C" after its number. If the answer is not right, write the correct answer after the number. This is the way to do the work for the first two examples:

1.	C
2.	10

Finish the work quickly. Then your teacher may ask you to read what you have on your paper.

1. $4+7=11$
2. $12-2=11$
3. $8+8=0$
4. $39-5=33$
5. $7-0=7$
6. $87-23=64$
7. $0+9=9$
8. $1-0=10$
9. $26-16=0$
10. $7+9=16$
11. $8+9=18$
12. $88-53=25$
13. $9-9=0$
14. $10-10=20$
15. $67-7=60$

37. Problems in Subtraction. (WRITTEN WORK.) Read the problems carefully to be sure you know what each one asks for.

1. Nineteen boys were playing in Jack's yard; 14 went home. How many boys were in the yard then?

2. Billy had 14 marbles in the morning, but by noon he had lost some. He had six left. How many had he lost?

3. Jean had 35 cents. She spent 12 cents for a pencil. How many cents did she have left?

4. Helen spent 10 cents to mail a box and a letter. It cost 2 cents to mail the letter. How much did it cost to mail the box?

5. Billy's hen had 13 little chickens. One morning after a storm, he found six of them dead. How many little chickens were alive?

6. Jim played at Jack's house from 3 o'clock until 5 one day. How many hours did Jim play at Jack's house that day?

7. Mabel is 9 years old. Her sister Ruth is 2 years younger. How old is Ruth?

SUMMARY

38. General Review. (WRITTEN WORK.) Be sure that you can give the differences in all of the 100 subtraction examples on pages 38 and 39 without mistakes. If you know how to give these differences quickly, your arithmetic work will be easier for you.

If you can't do this now, you should practice on these facts every day until you can.

Number your paper from 1 to 11 and write after the numbers the answers to the following questions.

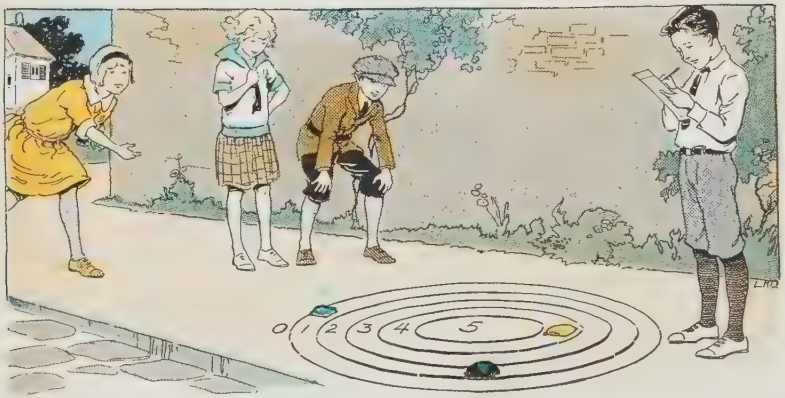
1. Is 8¢ more than 9¢?
2. Is 7¢ less than 8¢?
3. Is 5¢ less than a nickel?
4. Is eleven cents more or less than a dime?
5. What is the answer when you subtract nine from thirteen?
6. Fifteen minus eight equals what number?
7. What is the difference of four and eleven?
8. Subtract twenty-three from sixty-five.
9. What is the sum of 8 and 9?
10. How much must be added to 7 to make 15?
11. 3¢ plus 8¢ is how many cents?

Write the following examples on your paper and put the correct signs where the dotted lines are. For Example 12, your answer should look like this: *8+6=14.*

12. 8.....6=14
13. 8.....6=2
14. 9.....3=6
15. 4.....7=11
16. 13.....6=7
17. 14.....2=16
18. 23.....11=12
19. 17.....2=15

CHAPTER III

COLUMN ADDITION WITHOUT CARRYING



COLUMN ADDITION

39. Sums to 10. (Class Work.) Three of these children are playing Bean Bag. They take turns in throwing the three bean bags. You can see that the rings are numbered. Jane has just thrown the bags. Frank is keeping score. He wrote the numbers to show what Jane got for each bag. He added the numbers to get her score. This is the way he did it. ➳ Is the sum correct?

$$\begin{array}{r} 1 \\ 2 \\ 4 \\ \hline 7 \end{array}$$

When he added, he said, "4 and 2 are 6, and 1 are 7." Then he wrote the 7.

Each child took seven turns. Frank kept their scores. Here are the scores just the way he wrote them. Add them to see if he made any mistakes.

	1.	2.	3.	4.	5.	6.	7.
Jane	1 2 4 7	0 4 0 4	0 1 5 7	1 0 8 4	0 0 0 0	1 2 5 7	2 3 4 9
Dick	1 3 5 9	1 4 4 9	2 2 4 9	0 5 4 9	3 5 1 9	3 3 3 9	0 5 3 8
Lucy	4 3 2 9	4 2 3 9	1 4 2 6	1 2 2 5	2 4 3 9	0 5 2 7	0 4 1 5

Give the sums for these examples:

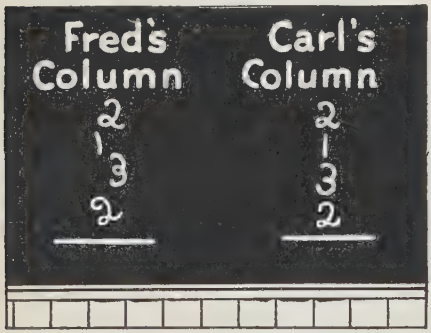
(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)	(*i*)
5	2	3	0	8	6	4	7	6
3	7	5	6	0	2	3	0	2
1	0	0	3	1	1	3	2	0

(*j*) 5+0+5 4+1+2 1+6+3

(*k*) 2+5+0 9+0+1 1+1+8

(*l*) 4+3+3 3+1+4 1+5+4

40. Writing Columns Straight. (WRITTEN WORK.) Do you see that the 27 examples in this lesson are printed in straight columns? You should learn to write figures in columns that are just as straight.



Look at the two columns at the left. Are you going to try to do your work the way Fred did his or the way Carl wrote his column? You will make fewer mistakes in adding if you write the columns straight.

EXERCISE

Copy these examples carefully and add:

1.	2.	3.	4.	5.	6.	7.	8.	9.
0	9	2	1	5	9	2	5	5
7	0	8	6	3	1	6	2	1
1	0	0	1	0	0	0	2	4

10.	11.	12.	13.	14.	15.	16.	17.	18.
				2		3		1
1	3		3	1		0	2	0
3	0	7	2	0	8	2	7	2
4	5	1	3	6	1	5	1	4
0	2	2	1	0	1	0	0	2

19.	20.	21.	22.	23.	24.	25.	26.	27.
	4	2	0	2		1		1
1	0	1	4	0	1	3	3	1
2	3	2	3	6	4	1	1	3
4	2	1	2	0	2	0	4	2
3	1	2	0	2	2	3	1	0

PROBLEM PRACTICE

41. Problems in Addition and Subtraction. (WRITTEN WORK.) Read the problems carefully before you try to get the answers.

1. Mary earned 7 cents drying dishes and 11 cents taking care of the baby. How much money did she earn in these two ways?

2. Paul sold one *Weekly Review* one week, seven the next week, and four the next week. How many did he sell in these three weeks?

3. Frank bought two valentines. He spent 14 cents for his mother's valentine and 4 cents for Mary's.

(*a*) How much did he spend for both?

(*b*) What was the difference in the costs of the two valentines?

4. Tom and Sue were learning to weigh things. They weighed two books. The larger one weighed 5 pounds, and the smaller one weighed 3 pounds.

(*a*) How much did both weigh?

(*b*) How much more did the larger book weigh than the smaller one?

5. Mary and Pauline made sandwiches for a tea party. They made 9 jelly and 6 cheese sandwiches.

(*a*) How many sandwiches did they make?

(*b*) How many more jelly sandwiches than cheese sandwiches did they make?

6. A third-grade boy played a girl in a bean-bag game. The boy scored 5, 4, 0, and 1, and the girl scored 2, 3, 5, and 1.

(*a*) Did the boy or the girl win?

(*b*) How much larger was the winning score than the losing score?

7. Nell and Fred dyed Easter eggs. Nell dyed three eggs purple, two green, one red, and two blue. How many eggs did she dye?

8. Fred dyed one egg red, one pink, two green, four yellow, and two purple. How many eggs did he dye?

EXTRA PROBLEMS FOR GOOD WORKERS

The three problems below are to be worked only by those who have done the eight problems just before these.

The third-grade children voted for a class leader. The rule was that the leader should have more votes than all the other children's votes put together. Four names were voted upon. Francis got 15 votes, John 8 votes, Mary 3 votes, and Earl 3.

1. Who had the most votes?

2. Was the highest number of votes more than the other votes added together?

3. By how many votes did Francis beat John?

EASY TWO-COLUMN ADDITION

42. Learning to Add Two-Figure Numbers. (CLASS WORK.) You are now going to study a new thing in addition. In this lesson you will learn how to add numbers that have two figures. You must add two-figure numbers in working the following problems.

1. While on an automobile trip Gordon and his father fished in a lake one day. Gordon caught 26 fish. His father caught 32. How many fish did both catch?

This is the way to find out:

26 32 58	Write one number over the other and add. Think, "2 and 6 are 8." Write the 8 under the 2. Think, "3 and 2 are 5." Write the 5 under the 3. Gordon and his father caught 58 fish that day.

Does this answer the problem?

2. The next day Gordon counted the lakes they passed. He counted 31 in the morning, 22 in the afternoon, and 10 in the evening. How many lakes did he count?

What does the problem ask you to find?

This is the way to find the answer:

31
22
10
63

Write the numbers in a column and then add.

Think, "0 and 2 are 2, 2 and 1 are 3." Write the 3 under the 0.

Think, "1 and 2 are 3, 3 and 3 are 6." Write the 6 under the 1. Gordon counted 63 lakes that day.

3. Their trip lasted three weeks. Gordon spent 42 cents the first week, 25 cents the second week, and 12 cents the third week. How many cents did he spend in the three weeks?

42¢
25¢
12¢

The numbers should be written in a column and then added.

Here they are in a column. Can you add them? What is the answer?

4. Would you know how to write these numbers in a column to add? 14, 3, 21, and 11. This is the way to do it. ➙

14
3
21
11

What is the sum?

Give the sums:

5.	6.	7.	8.	9.	10.
			22	13	11
21	50	42	12	40	32
21	13	34	41	41	46

43. Practice in Adding Two-Figure Numbers. (WRITTEN WORK.) Remember: you should do your work quickly and neatly. Always make straight columns when you copy addition examples.

EXERCISE

1.	2.	3.	4.	5.	6.	7.
	2	71	60	5	60	30
53	80	20	4	70	30	3
2	3	3	1	11	4	5
24	10	3	21	3	5	20

8.	9.	10.	11.	12.	13.	14.
40	50	1	30	30	30	10
2	6	50	9	30	8	25
12	10	6	20	7	10	30
25	1	31	10	10	40	2

15.	16.	17.	18.	19.	20.	21.
30	60	41	80	2	1	20
4	1	40	1	92	53	53
13	5	4	4	2	2	6
10	20	2	10	2	31	10

22.	23.	24.	25.	26.	27.	28.
40			1	2	40	1
30	51	20	31	71	1	1
10	1	12	32	2	6	60
7	37	42	30	21	1	4
1	10	13	4	1	30	2

ADDING BY ENDINGS

44. How to Add by Endings. (CLASS WORK.) Can you give quickly the sums of examples? If you can, it will be fun to see how quickly you can add the examples below.

1. How many examples do you see in Row (*A*)?

Row (*A*)	3 cows	3 birds	3 books	3
	2 cows	2 birds	2 books	2
	5 cows	5 birds	5 books	5

2. What is the sum in each example in Row (*A*)?

3. What is always the sum when you add 2 and 3?

Now let us write these examples again and put another figure just before some of the 2's.

Row (*B*)	3	↓3	↓3	↓3
	2	12	22	32
	5	15	25	35

4. How many sums are there in Row (*B*)?

5. Are the sums in Row (*B*) correct?

6. Read the sums in the last three examples in Row (*B*). What figure is the same in each one of the sums?

7. Tell why the figure 5 is in each sum.

8. Whenever you add 2 and 3, what is the sum?

Do you see that if 2 and 3 are 5, then 22 and 3 must be **25,** and 32 and 3 must be **35**?

9. What is the sum in this example? →

3
42

10. What is the sum of:

3	3	2	2	2	2	2
52	62	13	23	43	33	53

11. Are the sums in Row (*C*) correct?

Row (*C*)				
	4	4	4	4
	5	15	25	35
	9	19	29	39

Whenever you add 4 to a number that ends with 5, the answer always ends with 9, because **5 and 4 are 9.**

12. Give the sums for these examples:

4	4	4	5	5	5	5
45	65	55	14	34	24	44

Look at Row (*D*) and answer the questions below.

Row (*D*)						
	5	5	5	5	5	5
	9	19	39	29	49	59
	14	..4	44	..4	..4	..4
		↑		↑	↑	↑

13. Are the two sums that are printed correct?

14. What numbers belong on the blanks? What are the sums for the examples?

15. What numbers belong on the blanks in the examples below? After you have answered, give the sums.

5	5	9	9	9	9	9
49	59	15	35	25	45	55
..4	..4	..4	..4	..4	..4	..4

When you add two numbers ending in 9 and 5, the sum will always end with 4.

Give the answers:

16.	17.	18.	19.
12+3	15+4	19+5	43+2
22+3	24+5	29+5	25+4
42+3	14+5	15+9	49+5
13+2	35+4	39+5	33+2
53+2	44+5	45+9	25+9

45. Harder Work with Endings. (CLASS WORK.) Think of the figures that belong where the blanks are and give the answers.

1.	2.	3.
8 and 6 are 14	9 and 7 are 16	6 and 9 are 15
18 and 6 are ..4	19 and 7 are ..6	16 and 9 are ..5
28 and 6 are ..4	29 and 7 are ..6	36 and 9 are ..5
38 and 6 are	39 and 7 are	26 and 9 are ....
If you add 6 to a number ending with 8, what figure does the answer end with?	If you add 7 to a number ending with 9, what figure does the answer end with?	If you add 9 to a number ending with 6, what figure does the answer end with?

4.	5.	6.
1 and 8 are 9	8 and 9 are 17	2 and 8 are 10
11 and 8 are ..9	18 and 9 are	12 and 8 are ..0
21 and 8 are	38 and 9 are ..7	22 and 8 are ....

7.	8.	9.
5 and 4 are	7 and 6 are	6 and 4 are ....
25 and 4 are ..9	37 and 6 are ..3	16 and 4 are ..0
15 and 4 are	27 and 6 are	36 and 4 are ....
35 and 4 are	17 and 6 are	26 and 4 are ....

46. Practice in Adding by Endings. (ORAL WORK.) Give the sums in the following examples. Watch the endings. When you add 3 and 12, the sum is 15. The "5" is the "ending."

When you add 7 and 22 in the example in the box at the right, what is the ending of the sum? What is the sum?

7
22

EXERCISE

1.	5	4	3	0	2	2	3	6
	22	22	26	10	32	23	21	13
2.	3	5	5	3	6	3	3	7
	25	23	31	13	11	20	24	11
3.	4	8	7	4	4	8	9	2
	30	21	31	33	15	21	30	35
4.	35	10	4	2	17	19	33	43
	3	6	35	46	2	0	5	4
5.	23	22	26	24	24	22	42	34
	6	7	2	5	4	6	3	2

HARDER COLUMN ADDITION

47. Preparation for Harder Column Addition—Group I. (Oral Practice.) There are five columns of addition facts at the bottom of this page. You will need to use these addition facts when you add Rows 1 to 5 on page 61.

Look at the first example on page 61. It means 9+1+2. As you look at the 9+1, you think "10." Then you think "10 and 2 equal 12." Think the example like this. ➞

2	
1	Think:
9	10+2=12

Do you see how 10+2 will help you in adding the first example on page 61? All of the facts below in the columns (*A*) to (*E*) will help you to add the other examples on page 61. You should practice on the examples below until you can give the sums quickly.

EXERCISE

(*A*)	(*B*)	(*C*)	(*D*)	(*E*)
10+2	11+8	10+6	17+1	13+5
11+4	10+1	14+2	14+1	16+1
12+1	11+2	11+6	12+5	14+4
10+4	12+4	13+3	12+6	15+3
12+7	11+5	15+2	13+4	18+1
13+2	10+9	10+7	13+1	15+4
11+3	12+2	12+3	16+2	16+3
10+5	14+3	13+6	14+4	15+1
10+3	11+1	10+8	11+7	17+2

48. Practice on Column Addition—Group I. (ORAL PRACTICE.) Answer the three questions and then find the sums in the five rows.

1. What example in Row 1 uses "11 and 4 make 15?"
2. What example in Row 2 uses "12 and 2 are 14?"
3. In Row 5 what example has in it 15 and 1 are 16?

EXERCISE

Add and give the sums:

Row 1.	2	4	1	4	7	3	2	3	5
	1	9	4	7	5	6	8	2	9
	9	2	8	3	7	4	5	9	1
Row 2.	8	4	1	2	5	3	9	2	1
	3	9	3	6	8	7	8	3	7
	8	3	7	5	3	7	2	9	4
Row 3.	6	3	2	6	7	2	8	6	3
	2	9	6	4	5	6	4	4	8
	8	4	8	7	5	9	6	9	4
Row 4.	1	5	1	1	6	7	4	2	4
	6	6	8	5	7	5	5	8	9
	7	6	9	9	5	6	8	8	5
Row 5.	4	1	3	1	5	1	2	4	3
	8	7	9	9	7	8	9	7	9
	6	9	6	9	6	7	8	8	7

49. Further Practice on Adding by Endings. (ORAL WORK.) The examples in this article are harder than the ones on page 59. You must watch two things:

1. Watch the **endings.**

2. Watch the number that you put with the endings.

5 27 32	The black figures are "endings" The sum of 7 and 5 must end with a 2.

Study Examples (*A*), (*B*), and (*C*). Do you see that the endings are all the same? When you add 6 and 6, the sum always ends with 2, doesn't it?

(*A*) 6 + 26 = 32 (*B*) 6 + 46 = 52 (*C*) 6 + 36 = 42

The numbers that the arrows point to are the ones you put with the endings.

Give the sums:

1.	4	7	3	6	8	9	5	7
	16	13	18	26	24	12	16	24
2.	3	8	8	4	7	7	5	6
	27	14	12	26	23	14	28	15
3.	8	6	7	5	9	8	6	9
	22	16	25	26	22	34	36	13
4.	7	5	7	7	9	6	4	5
	16	36	33	35	32	34	37	38

5.	9	4	6	9	5	8	9	7
	15	19	27	24	17	13	21	27
6.	19	17	25	18	28	18	17	18
	1	4	8	7	3	4	7	6
7.	28	27	16	34	8	25	28	17
	8	8	9	9	26	5	2	9

50. Preparation for Harder Column Addition—Group II. (Oral Practice.) Tell where 16+4 is used in Row 1 on page 64. Do you see that you will need to learn the facts in Columns (*A*) to (*E*) below, if you want to give the sums in Rows 1 to 5 as quickly as you should? These are harder than the ones on page 60, but you can learn to say them just as fast, can't you?

EXERCISE

(*A*)	(*B*)	(*C*)	(*D*)	(*E*)
16+4	12+8	13+9	17+7	18+9
13+7	15+7	16+7	12+6	17+0
16+6	14+9	15+9	18+6	13+6
15+6	17+5	11+0	18+8	14+4
18+5	13+8	17+6	16+8	12+5
14+8	11+9	14+6	14+5	16+9
12+9	15+8	17+8	18+7	18+2
14+7	16+5	18+4	17+9	17+2
17+3	17+4	12+7	15+5	18+3

51. Practice on Column Addition—Group II. (ORAL PRACTICE.) Try hard to do the work in this exercise without mistakes.

EXERCISE

Add and give the sums:

Row 1.	4	6	5	7	6	8	3	9	7
	7	8	9	4	8	7	9	6	5
	9	7	9	9	8	7	8	6	9
Row 2.	9	5	8	7	8	4	9	8	5
	6	8	5	6	8	9	5	7	9
	8	9	7	9	5	8	6	8	7
Row 3.	7	9	9	6	0	6	4	7	8
	8	4	8	9	7	9	9	4	9
	8	9	7	8	4	5	9	8	8
Row 4.		6		7		7	9		8
	6	9	5	9	8	9	8	5	9
	7	5	9	4	7	3	1	9	7
	5	4	5	4	9	6	8	6	2
Row 5.	0		9			3			2
	8	6	9	4	2	9	5	9	9
	6	5	2	8	8	4	8	7	1
	3	8	7	6	9	5	4	9	8

52. Preparation for Column Addition—Group III. (ORAL PRACTICE.) Look at Column (*B*). Do you see the two examples with the arrows pointing to them? Find in Row 2, page 66, the example in which these two examples are used. Can you add the rows very easily if you don't know the answers to the examples in (*A*), (*B*), (*C*), and (*D*) below?

EXERCISE

(*A*)	(*B*)	(*C*)	(*D*)
10+9	16+7 ←	14+8	12+7
19+6	23+9 ←	22+6	14+5
17+4	13+9	28+9	19+7
21+7	22+5	15+6	26+7
11+8	16+8	15+5	15+4
19+8	24+6	20+0	13+6
18+1	15+9	19+3	19+9
19+4	24+3	14+7	13+5
15+8	16+3	21+6	18+7
23+5	15+7	27+9	12+5
19+5	22+9	13+8	25+8
12+9	14+9	14+6	12+0
21+8	23+8	20+7	12+6
17+0	13+7	12+8	13+4
17+9	20+6	20+8	17+8
14+5	19+2	15+4	19+8

53. Practice on Column Addition—Group III. (WRITTEN WORK.) Be sure to do neat work as you add the columns below.

EXERCISE

Add and give the sums:

Row 1.	6	7	8	4	5	8	9	5
	9	4	8	1	8	9	0	5
	7	9	5	9	8	7	8	8
	3	8	6	9	7	5	9	6
Row 2.	9	5	6	3	9	8	6	2
	7	9	8	9	7	9	7	3
	8	6	7	8	9	6	8	9
	8	7	9	7	6	8	5	7
Row 3.			9					9
		0	6		7	8	3	6
	6	5	7	8	6	8	4	8
	7	6	8	7	5	9	9	7
	8	9	6	6	9	3	6	7
Row 4.							8	7
		9	6	8		8	7	7
	7	6	0	4	5	4	5	5
	6	5	5	8	8	4	9	9
	6	8	7	7	4	9	4	5

54. Review of Subtraction Facts. (ORAL WORK.) We must not forget subtraction while we are learning new things about addition. In Boxes (*A*) to (*H*) below is some good practice.

Subtract the black number in the center from each number around the outside. Start with the number that the arrow points to and go around to the right. Look at Box (*A*). The first example is 11 − 2. The next one is 5 − 2. In giving the answers, say only the differences, like this: 9, 3, 5. Keep on in this way going around the box until you come to 9 − 2.

(*A*)

11	5	7	4
9	**2**		6
2	10	8	3

(*B*)

5	6	4	11
3	**3**		7
9	10	12	8

(*C*)

11	4	6	13
5	**4**		8
9	7	12	10

(*D*)

5	12	9	6
13	**5**		11
7	10	14	8

(*E*)

10	9	13	7
14	**6**		15
6	11	8	12

(*F*)

7	15	11	9
12	**7**		13
10	16	14	8

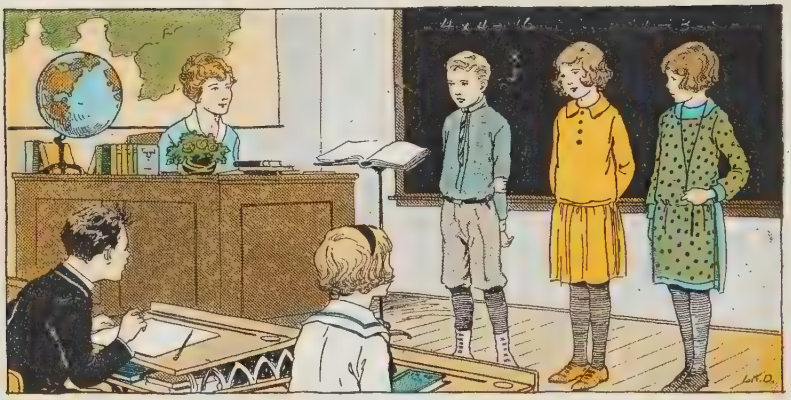
(*G*)

8	16	14	10
12	**8**		13
11	15	17	9

(*H*)

9	17	14	11
13	**9**		16
12	18	15	10

55. Review of Adding by Endings. (ORAL PRACTICE.) Did you ever count by different numbers? Of course you can count by ones. Try counting by other numbers, also. The three pupils in the picture on the next page are playing the game of "Counting." They are counting by 2's now, beginning with 1. The first pupil says "1," then the next pupil says "3," and the third says "5"; then the first pupil says "7,"



and so on. The other pupils are watching for mistakes. If a mistake is made, the pupil in his seat who puts his hand up first takes the place of the pupil who made the mistake. Play the counting game below.

COUNTING GAME

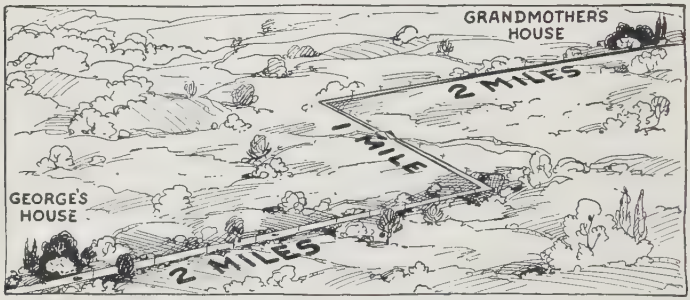
1. Count by 2's to 41, beginning with 1.
2. Count by 2's to 42, beginning with 2.
3. Count by 3's to 43, beginning with 1.
4. Count by 3's to 44, beginning with 2.
5. Count by 3's to 45, beginning with 3.
6. Count by 4's to 45, beginning with 1.
7. Count by 4's to 46, beginning with 2.
8. Count by 4's to 47, beginning with 3.
9. Count by 4's to 48, beginning with 4.
10. Count by 5's to 46, beginning with 1.
11. Count by 7's to 51, beginning with 2.
12. Count by 9's to 57, beginning with 3.

56. Rapid Drill. (CLASS WORK.) A third-grade child should be able to give the answers to all of the examples below without using a pencil. Do you think that you can do it?

Study for ten minutes. Be ready to give the answers when your teacher says "Ready."

	(A)	(B)	(C)	(D)	(E)	(F)
1.	9+8	11−3	16+7	13 −5	8+5+9	14−9
2.	18+3	12 −5	7+8+7	7−7	25+9	11−6
3.	6+4+8	17 −8	0+9+7	12−4	27+4	16−0
4.	8+6+6	13 −6	11 −5	15+8	14−7	7+2+7
5.	12 −9	23+8	0−0	16+9	11 −2	19+4
6.	12−8	36+5	16 −9	7+5+8	10−4	17+3
7.	4+9+8	15−9	5+6+5	11 −8	7+6+9	14−6

57. Problems in Addition. (WRITTEN WORK.) The picture below shows you the road from George's house to his grandmother's house.



1. How many turns are there in the road?

2. How many miles is it from George's house to the first turn in the road?

3. How far is it from the first turn in the road to the second turn?

4. How far is it by this road from George's home to his grandmother's home?

5. One day when Jane and Mary were riding, they saw 2 white horses in an orchard, 3 in a pasture, 2 hauling a wagon, and 1 that a boy was riding. How many white horses did they see on their ride?

6. Dorothy and Betty bought some things for their playhouse kitchen. How much did they spend if the potato masher cost 9 cents, the egg beater 9 cents, and the pancake turner 7 cents?

7. Helen visited a store where Indian things were sold. She paid 25 cents for a pair of moccasins for her doll, 10 cents for a little canoe, and 10 cents for a doll papoose. What did all these toys cost?

8. The children in the Wilson School put food on the windowsill for birds. One day they counted 2 sparrows, 3 robins, 2 nut hatches, and 1 blue jay eating the food. How many birds did the children count feeding on the windowsill that day?

9. One morning Harry found some little puppies in the barn. 3 were brown and 5 were black. How many puppies did Harry find in the barn that morning?

58. Review of Words Used in Arithmetic. (SILENT READING.) Read the following questions carefully and be ready to answer them.

1. I am made of silver. I am worth 2 nickels. How many cents am I worth?

2. I am a brown coin. I am not worth as much as a nickel. What is my name?

3. I am a coin bigger than a dime, but I cannot buy so much as a dime, because I am not silver. I am not as large as a nickel. What is my name?

4. I am a larger coin than a nickel. I can buy more than a dime. What is my name?

5. I am made of two little lines. When you see me between two numbers, you add the numbers. Can you name me?

6. I am a little line. When you see me between two numbers, you subtract the smaller number from the larger one. Can you name me?

7. Is 14 smaller than 12?

8. There are three examples at the right. One is (*A*), one is (*B*), and the third one is (*C*). Which one is written in a column?

(*A*)	(*B*)	(*C*)
4+6 =	5	Six less
	0	one is .....
	9	

9. How many figures are there in 64?

10. A number is smaller than 9. It is larger than 7. It is the difference of 10 and 2. What is it?

11. When we see + between two numbers, we..... them.

12. When we see − between two numbers, we..... them.

13. The sum is the answer in.....

14. The difference is the answer in .....

15. When numbers are written like this, ➸ we.....them.

$$\begin{array}{r} 9 \\ -6 \\ \hline \end{array}$$

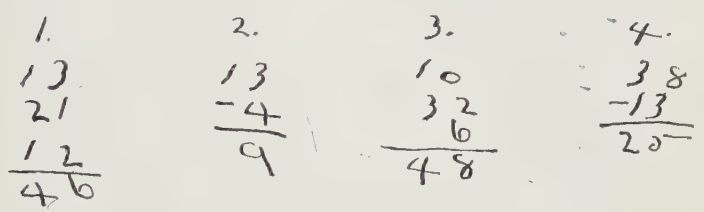
16. When numbers are written like this, ➸ we.....them.

$$\begin{array}{r} 9 \\ +6 \\ \hline \end{array}$$

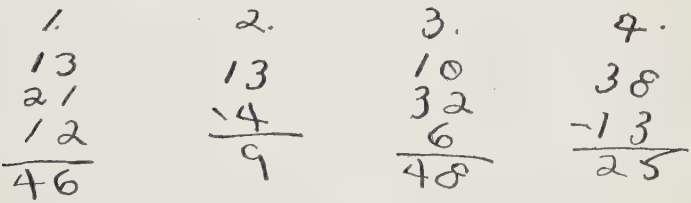
59. Neatness in Written Work. (Oral and Written Work.) When you do arithmetic work on paper, you must be careful to make your work neat. A

third-grade class took a little written test one day, but some of the pupils didn't do very neat work. Here are three of the papers:

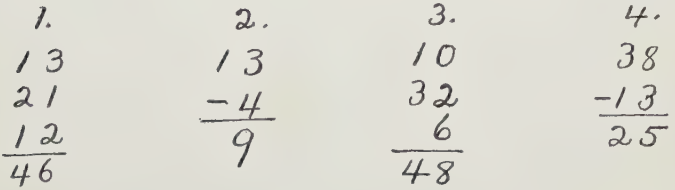
Betty's Paper



Bob's Paper



Edith's Paper



1. Which paper do you like best?

2. Write the test yourself and see if you can make your work look as neat as Edith's.

60. Mixed Review. (WRITTEN WORK.) Find the answers to these examples and problems. Number each one as you work. Copy the examples if you need to, but wherever you can, write only the answers. Be sure to do neat work.

EXERCISE

1. *Add:*

12
23
2
10

2. *Subtract:*

95
72

3. *Write in a column and add these numbers:*

13 22 24

4. *Subtract:* 9 from 16

5.

46
+23

6.

46
−23

7. What is the difference of 17 and 8?

8. What is the sum of 27 and 72?

9. Take 45 from 68.

10. Add twenty and thirty-four and five.

11. Subtract 14 cents from 39 cents.

12. $14-5=?$

13. A top cost 5 cents, and a toy windmill cost 19 cents. What was the difference in the cost of these two toys?

14. $5+33+41=?$

15. $9-0=?$

61. Problems in Addition and Subtraction. (WRITTEN WORK.) Read every problem carefully.

1. A fourth-grade class in Washington School had 16 boys. The nine best ball-players were chosen for the class ball team. The other boys were to be a second team. How many boys were on the second team?

2. The class team played the first game against Field School. The score was 4 to 2 in favor of Field, when Ted, on the Washington team, hit a "homer," making 3 more runs. Which team was ahead then?

3. Washington School won with a score of 11 to 6. How many more runs did they have than Field?

4. Two boys of Washington School were hurt, and so boys from the second team took their places. How many different boys from Washington School played in the game?

5. The children from the third and fourth grades went on a picnic. There were 22 children from the third grade and 31 children from the fourth grade. How many children were there at the picnic?

6. Two teachers, the principal, and three mothers went to the picnic, too. How many persons were at the picnic?

7. There were 13 boys from the third grade and 16 boys from the fourth grade. How many boys were there at the picnic?

SUMMARY

62. General Review. (WRITTEN WORK.) Show that you know what you have studied by getting the correct answers to the following questions and examples.

1. Add 15 and 23.

2. Write the sign that means subtract.

3. What is the difference of 68¢ and 25¢?

4. Find the sum of 34 and 53.

5. Take thirteen away from the answer to Example 4.

6. What number belongs where the dots are in this example: $9-\ldots\ldots=9$?

7. Is 16 less than 14?

8. Does $8+9$ equal $9+6$?

9. Write a two-figure number.

10. Is the sum of 9 and 0 larger than the sum of 8 and 2?

11. 14 and how many more are 49?

12. What is the answer to 79 minus 13?

13. Write 42, 2, 10, and 25 in a column and find the sum.

14. Take eight away from the sum of nine and eight.

15. If you spent ..... cents one day and ..... cents the next day, would you add or subtract to find out how much you spent on both days?

16. 7 cents = 1 nickel and ..... cents.

17. What number is missing below?

4 8 12 16 24 28 32 36

Copy Examples 18 to 26, putting the correct signs where the dotted lines are.

18. 9....6....6 = 21 **21.** 9....5 = 14 **24.** 20¢....9¢ = 29¢

19. 6....6 = 0 **22.** 10....1 = 9 **25.** 18.....4 = 22

20. 6....1 = 7 **23.** 18....9 = 9 **26.** 19.....12 = 7

Two Important Things to Do:

1. **Practice the 100 addition facts on pages 17 and 18 unless you can give every sum quickly and without a mistake.**
2. **If you do not know the 100 subtraction facts on pages 38 and 39, practice on them until you do.**

CHAPTER IV

CARRYING IN ADDITION. DOLLARS AND CENTS

READING AND WRITING NUMBERS

63. The Meaning of Numbers to 1000. (Class Work.) Watch to see how large numbers are made from these ten figures:

0, 1, 2, 3, 4, 5, 6, 7, 8, and 9.

1. *Study these columns:*

10	(*a*) How many tens do you see in the column?	100	(*a*) How many hundreds do you see here?
10		100	
10		100	(*b*) What is the sum below the line?
10		100	
10		100	
10	(*b*) Add the column to see if the sum at the bottom is correct.	100	(*c*) Add this column to see if the sum is correct.
10		100	
10		100	(*d*) 1000 is read **one thousand.**
10		100	
10		100	
100	(*c*) How many tens in 100?	1000	(*e*) How many hundreds in 1000?

2. How many tens in these numbers: 40, 70, 30, 80, 90, 60?

3. How many hundreds in 300, 500, 700, 800, 900?

4. Read the numbers in columns (*A*) to (*F*) on the next page. Read down the columns.

This is the way to read numbers:

120 is read: "One hundred twenty."
442 is read: "Four hundred forty-two."

(*A*)	(*B*)	(*C*)	(*D*)	(*E*)	(*F*)
100	110	210	401	613	810
200	130	220	403	623	949
300	140	240	410	643	700
500	160	250	500	653	807
700	170	300	507	663	966
900	190	370	580	689	909
1000	200	390	590	693	860

5. Study the number 543 below.

$$\begin{array}{rcccccc} & 100 & & & & & \\ & 100 & & 10 & & & \\ & 100 & & 10 & & 1 & \\ & 100 & & 10 & & 1 & \\ & 100 & & 10 & & 1 & \\ \hline 543 = & 500 & + & 40 & + & 3 & \end{array}$$

Do you see that 543 is a short way of writing the sum of 500, 40, 3?

6. What does the 5 in 543 show? The 4? The 3?

Tell the numbers that belong on these blanks:

7. 263 equals ..... hundreds ..... tens ..... ones.

8. 407 equals ..... hundreds ..... tens ..... ones.

9. 180 equals ..... hundred ..... tens ..... ones.

10. 778 equals ..... hundreds ..... tens ..... ones.

11. 596 equals ..... hundreds ..... tens ..... ones.

64. Writing Numbers. (Written Work.) Do you think that you can write numbers in figures when they are printed in words? Try it.

Write the number that is:

1. 7 hundreds, 4 tens, and 6 ones.
2. 8 hundreds, 0 tens, and 3 ones.
3. 9 hundreds, 6 tens, and 4 ones.
4. 6 hundreds, 8 tens.
5. 5 hundreds, 0 tens, and 5 ones.
6. 3 hundreds, 5 tens, and 2 ones.
7. 1 hundred, 9 tens.

Write in figures:

8. thirty-seven
9. eight hundred
10. forty-six
11. four hundred one
12. four hundred eleven
13. six hundred ten
14. nine hundred nine
15. four hundred eighty-seven
16. nine hundred thirty-one
17. three hundred fifty-three
18. five hundred sixty-five
19. six hundred thirty-six

65. How to Use This Book. (Class Work.) This lesson will teach you some things about how to use your book.

1. Do you see a little picture on this page? (*a*) What does it tell you? (*b*) Why should you read very carefully each lesson that begins with this sign?

2. Find the very black number after the "New-Work" sign. It is called the "article" number. What is the number of the article you are now reading?

3. Read the words after the article number. Do they tell you what this article is about?

4. Find the words "Class Work." These words mean that this lesson is to be used as a reading lesson in class. How is Article 71 to be used?

5. Find the article which is numbered "42." (*a*) Does it have a "New-Work" sign? (*b*) What does Article 42 tell you about?

6. Find an article which does not have a "New-Work" sign. (*a*) What is its number? (*b*) What does it tell you about?

7. Look on page 83. What work begins there?

8. Find the last article in the book. (*a*) What is its page number? (*b*) What is its article number?

9. Find page 39. How will that page help you in your arithmetic work?

10. Find the table of "Contents" at the beginning of the book. How many chapters are in this book?

ADDING LARGER NUMBERS

66. Getting Ready to Add Larger Numbers. (Class Work.) Answer the questions below and on page 82 and tell what numbers belong on the blanks.

1. How many cents are there in a dime?

2. How many dimes are there in 20 cents?

3. How many dimes are there in 30 cents?
4. 15 cents is 1 dime and ..... cents.
5. 18 cents is 1 dime and ..... cents.
6. 24 cents is 2 dimes and ..... cents.
7. 32 cents is 3 dimes and ..... cents.
8. 15 cents is 5 cents and ..... dime.
9. 18 cents is 8 cents and ..... dime.
10. 24 cents is 4 cents and ..... dimes.
11. 32 cents is 2 cents and ..... dimes.
12. 17 cents is ..... cents and ..... dime.
13. 23 cents is 3 cents and ..... dimes.
14. 34 cents is 4 cents and ..... dimes.
15. How many ones make ten?
16. How many tens make 20?
17. How many tens make 30?
18. 12 is 2 ones and ..... ten.
19. 13 is 3 ones and ..... ten.
20. 23 is 3 ones and ..... tens.
21. 8 is 8 ones and ..... tens.
22. 33 is 3 ones and ..... tens.
23. 25 is 5 ones and ..... tens.
24. 28 is 8 ones and ..... tens.
25. 17 is 7 ones and ..... ten.
26. 31 is 1 one and ..... tens.

CARRYING IN ADDING LARGER NUMBERS

67. How to Add Larger Numbers. (CLASS WORK.) You have learned much about adding, but there are other things you ought to know. All but one of the following examples should be easy for you. Without using your pencil, get ready to give the answers to them.

1. 7 and 9
2. 17 and 8
3. 25 and 7

4. 13 boys
+12 boys

5. 5 cents
3 cents
10 cents

6. 47 cents
28 cents

Which example is the hard one? Most pupils think it is Example 6. This is the way to find the answer:

47¢
28¢
75¢

8¢ and 7¢ are 15¢. 15¢ is 5 **cents** and 1 **dime.** Write the 5 under the 8. Then add the 1 dime to 2 and 4. The sum of 1 and 2 is 3. 3 and 4 are 7. Write the 7 in the dimes' column. What is the answer?

7. 27¢
38¢

Can you give the answer to Example 7? Use pencil and paper if you need to.

8. 29¢
17¢
38¢

You may need some help on Example 8. 8¢ and 7¢ are 15¢. 15¢ and 9¢ are 24¢. 24¢ is 4 cents and **2** dimes. Write the 4 under the cents' column. Then add 2 dimes to the 3 and 1 and 2. Write the sum under 3 in the dimes' column. What is the answer?

Look at Example 6 again. How many dimes did you add to the dimes' column? In Example 8 how many dimes did you add to the dimes' column? When

you add a number to another column, you **carry** the number to that column.

9.	7¢
	28¢
	19¢
	28¢

Is the sum of the cents' column 32?

What will you have to carry in this example? What is the answer to the example?

10. John sold 28 papers one day and 34 the next day. How many papers did he sell on both days?

28 papers
34 papers
62 papers

In this example you think, "4 and 8 are 12; write the 2 and carry the 1. 1 and 3 are 4. 4 and 2 are 6. Write the 6." Here you are adding **papers,** not **cents.**

In all addition problems you must remember what you are adding, or your answers won't be right. Since you are adding papers, the answer to this example is 62 papers. "Papers" is the name of this answer.

Be sure that you always give the right name to your answer.

Look at Examples (*A*), (*B*), (*C*), and (*D*) on page 85.

11. What number is carried in Example (*A*)?

12. What number is carried in Example (*B*)? In (*C*)? In (*D*)?

(*A*)	(*B*)	(*C*)	(*D*)
47	37	49	29
20	5	8	9
12	23	13	19
79	65	70	34
			91
Nothing carried	*Carry 1*	*Carry 2*	*Carry 3*

You have now learned to *carry* in addition. Remember that you sometimes carry 1, sometimes 2, other times 3, or even more. Sometimes you carry nothing.

68. Practice in Finding What Is Carried. (Oral and Written Work.) Without using your pencil, first tell what number you would **carry** in these examples. Then copy the examples and find the answers.

1.	2.	3.	4.	5.	6.	7.	8.
						18	
50		4	19	15	9	3	37
6		4	8	37	16	23	18
3	25¢	20	29	15	8	33	8
24	25¢	70	39	28	45	3	19

9.	10.	11.	12.	13.	14.	15.	16.
				20			
37	24	36	16	1	19	27	40
8	3	9	19	11	26	9	50
37	14	28	36	45	39	29	4
7	56	18	9	4	7	8	3

PROBLEM ANALYSIS

69. How to Get Answers to Problems. (CLASS WORK.) Sometimes children who can add and subtract very well have trouble in getting the answers to problems, because they do not know when to **add** and when to **subtract.**

This lesson will give you some help in getting the answers to problems. Read the first problem at least twice and then see if you can answer the three questions about it.

Problem 1. Jane had 16 cents. Her father gave her 10 cents more. How much did Jane then have?

1. What does this problem ask you to find?
2. Must you add or subtract to get the answer?
3. What is the answer?

Sometimes a problem will ask you to find more than one answer. Look at Problem 2 below.

Problem 2. Tom's toy boat cost 45 cents. Will's toy boat cost 32 cents. (*a*) What did both boats cost? (*b*) How much more did Tom's boat cost than Will's?

1. What does part (*a*) of this problem ask you to find?
2. Will you add or subtract to answer (*a*)?
3. What is the answer to (*a*)?
4. What does question (*b*) of the problem ask for?
5. Must you add or subtract in (*b*)?
6. What is the answer to question (*b*)?

Problem 3. Ruth practiced her music lesson from ten minutes after three until twenty minutes after three. How many minutes did she practice at that time?

1. What does this problem ask you to find?
2. Must you add or subtract to get the answer?
3. What is the answer?

Problem 4. How long did Lois practice her lesson if she began at five minutes after two and stopped at thirty minutes after two?

1. What does this problem ask for?
2. Must you add or subtract?
3. What is the answer?

Sometimes in working a problem you will have to go back to earlier problems and use their answers to get the answer to the new problem. Problem 5 uses the answers you found to Problems 3 and 4.

Problem 5. Lois practiced how much longer than Ruth?

1. What numbers will you need for this problem?
2. What must you do to get the answer?
3. What is the answer?

In working problems, read each problem carefully **at least twice,** and then ask yourself these questions:

1. **What does this problem ask me to find?**
2. **What must I do to get the answer?**
3. **Is there more than one part to the problem?**
4. **Do I need to use numbers from another problem?**

70. How to Estimate Answers. (Class Work.) Careful pupils will be interested to know that there are some easy ways to keep from making foolish mistakes. As you read a problem carefully and ask yourself the questions in this article, **estimate** or think what would be a **reasonable** answer. An "estimate" is a careful guess. A reasonable answer is one that is about right.

Read Problem 1 carefully and estimate **about what** the answer should be.

Problem 1. John has 27 cents and Harry has 24 cents. How much do both boys have?

1. What does this problem ask you to find?

2. Must you add or subtract?

3. You will keep from making a foolish mistake if you say to yourself: "27 cents is a little more than a quarter, and 24 cents is a little less than a quarter. The answer must be about two quarters or 50 cents." $(25+25=50.)$

4. Is 50 cents about the correct answer? What is the correct answer?

5. If a pupil worked this problem and got 41 cents for an answer, what did he probably forget to carry when he added 27 and 24?

☛ Do you think that he would have made this foolish mistake if he had first estimated that a reasonable answer would be about 50 cents?

Problem 2. Joe had 26 marbles. One day he counted them and found that he had lost all but 14. How many had he lost?

1. What does this problem ask?

2. Will you have to add or subtract to find the answer?

3. Must the answer be less than 26?

4. Would it help to think to yourself: "26 is about 25, and 14 is about 15. 15 from 25 is 10. The answer must be about 10."

5. Is the answer about 10? What is the correct answer?

It often helps to think of the numbers in a problem as ending in a five or a zero when you estimate a reasonable answer. Thus:

(*a*) If you think of $27+39$ as almost the same as $30+40$, you will get 70 as an estimate of a reasonable answer. What is the correct answer?

(*b*) $94-33$ might be thought of as $90-30$, giving 60 as an estimate of a reasonable answer. How far is 60 from the correct answer?

☛ Do you think you would make a very foolish mistake in either of the two problems above if you first estimated reasonable answers?

Problem 3. An automobile traveled 18 miles the first hour, 22 miles the second hour, and 29 miles the third hour. How far did it travel in the three hours?

1. What does this problem call for?

2. Must you add or subtract?

3. Do you think that $20+20+30=70$ would be a good way to estimate a reasonable answer? How nearly correct is 70? Is the correct answer 69 **hours** or 69 **miles** or 69 **automobiles?**

There is another good way to keep from making foolish mistakes. Think:

When I **add,** the answer will be **more** than any one of the numbers I am adding.

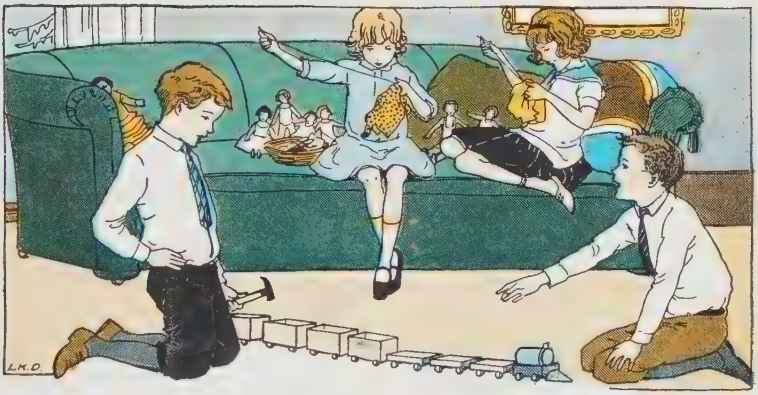
When I **subtract,** the answer will be **less** than the larger number in the example or problem.

Now estimate reasonable answers to the three problems below. Then work the problems. See how close your estimated answer is to the correct answer.

1. On Tuesday Alice practiced her music lesson 32 minutes before school and 24 minutes after school. How long did she practice that day?

2. Two boys had 31 cents together. They wanted to buy a ball costing 75 cents. How much more money did they need?

3. Frank estimated that a reasonable answer to a problem would be 85 hours. The correct answer was 62 hours. How far did he miss the right answer?



71. Problems about Children's Presents. (WRITTEN WORK.) Read carefully the problems in this article before you try to work them. As you read, estimate an answer for each one. Write this answer after the number of the problem. Then work each problem and see how close the answer is to your estimate. Be sure to write the numbers in straight columns before you add them.

Just before Christmas the children in a third-grade class planned to take presents to the Children's Hospital. They made some of the presents. The problems below tell what things they did.

1. Joe and Fred worked a little while every day for 2 weeks making a train of cars. They used 3 Nabisco boxes for flat-cars; 4 chalk boxes for box-cars; 1 cocoa can and 1 baking-powder can for the engine. How many boxes and cans did they use all together?

2. How many dolls did Betty and Clara dress if they dressed 3 rag dolls and 4 other dolls?

3. Tom painted some chairs for the dolls. He bought a brush for 15 cents and a can of red paint for 20 cents. How much money did he spend for the paint and the brush?

4. Carl and Sam made 2 beds, 3 chairs, and 1 table for a doll house. How many pieces of furniture did they make?

5. How many little dishes did Nell and Jane give if they gave 4 cups, 3 saucers, 5 plates, 1 sugar bowl, 1 teapot, and 1 cream pitcher?

6. Mary paid 12 cents for jackstones, 10 cents for a ball, and 48 cents for a book. How much money did she spend for these presents?

7. How many marbles were in the sack which Billy gave, if there were 6 commies, 8 glassies, and 7 steel marbles?

8. Charles and Jim thought the boys in the hospital might like to make something, and so they paid 25 cents for a hammer and 15 cents for nails. What did the hammer and nails cost?

9. Four girls packed a box for a girl who could sew. Their mothers gave them some pieces of cloth. They paid 10 cents for thread, 5 cents for needles, 5 cents for pins, 10 cents for a thimble, 35 cents for a pair of scissors, and 19 cents for a little doll. How much did they spend?

CHECKING ADDITION

72. How to Check Addition. (CLASS WORK.) While you should learn to do your arithmetic work quickly, it is more important to get correct answers. When you add scores in games or add to see how much some things will cost, you want to be sure that your answers are correct, don't you?

One way to be pretty sure that your answers in addition are correct is to "check" your work. This is the way to do it.

(A)

The Work

39
18
25
82

Add upwards and write your answer below the line.

The Check

82
39
18
25
82

Then add **downwards** and write the answer at the top, above the dotted line.

If the two answers are the same, you may be pretty sure that they are correct.

(B)

98
17
19
27
35
98

Look at Example (*B*). Has it been checked? Add the column yourself. Is 98 the correct sum?

☛If you make many mistakes in adding, you should check each example in this way.

73. Using Checks in Addition. (WRITTEN WORK.) Here is some addition work that Ray did. He was in a hurry to go and play ball; so he didn't bother to check his work.

Copy these examples on your paper. Then add and check each one. Remember to add **upwards** to get the answer at the bottom, and add **downwards** to get the answer at the top. If you find mistakes in Ray's work, cross them out and write the correct answer. The first example shows you how to do this.

1.	2.	3.	4.	5.	6.
74					
47	12	30	21	36	28
8	19	18	17	9	17
19	53	44	36	47	27
~~75~~	84	93	74	82	9
74					81

74. Problems about Costs. (WRITTEN WORK.) Pupils who **read carefully** and **check their work** do the best work in arithmetic.

1. Walter, Helen, Jack, and Rosalie went Christmas shopping. Walter paid 15¢ for a Jack-in-the-box and 3¢ for a Christmas card. How much did he spend?

2. Helen paid 7 cents for one Christmas card, 9 cents for a candy cane, 8 cents for a top, and 8 cents for a doll comb. How much did Helen spend?

3. Rosalie had a quarter. She spent 5 cents each for two rubber balls and 10 cents for a toy wrist-watch. How much money did she spend?

4. Jack paid 15 cents for a fire hat, 25 cents for a fire-engine, and 10 cents for a handkerchief. How much money did Jack spend for all three?

5. In the city where these children live any child under twelve years of age may ride on the street car down town and back for five cents. The four children, who were ten years old, rode both ways when they went shopping on this trip. How much did they spend for carfare?

6. The children bought a Christmas tree for the birds. They spent 9 cents for the tree, 5 cents for suet, 3 cents for an apple, and 4 cents for nuts. How much did the tree and the other things cost all together?

7. On a trip that she made to California, Harriett spent these amounts of money:

Oranges	5¢	Chocolate	6¢	Salted peanuts	7¢
Gum	5¢			Cookies	8¢

How much did she spend in all?

75. Saving Time and Getting More Practice. (A Silent Reading Lesson.) You can save time and get more practice on the examples in this book if you will learn how to put a piece of paper under or above the printed examples. Then just write the answers on the paper. Can you tell how this saves time?

But your teacher may not let you do this unless you can copy examples neatly and correctly. See how this girl wrote the answers without copying the examples. She checked her work, too. Get ready to show your teacher that you know how to write answers without copying the examples.

This girl placed the top edge of a piece of paper under the first row of examples. She then added **upwards** and wrote her answers on the paper below the examples. When she had written the answers to the examples in the first row, she folded the paper about an inch from the edge and put it **above** the examples.

The picture shows her adding **downwards** and placing her answers on the paper below the first answers she wrote. If the two answers are the same, she is pretty sure they are correct. Can you do this? Be ready to show your teacher that you know how. Try this way of saving time with the examples on page 97.

76. Adding with Carrying. (WRITTEN WORK.) Add the examples below. Check your work. You should get every answer correct. It will save time if you add without copying.

EXERCISE

1.	2.	3.	4.	5.	6.	7.	8.
	24					19	
14	7	4	40	12	8	6	5
29	8	26	20	6	9	26	55
9	49	7	20	16	68	15	16
41	3	50	10	34	8	7	8

9.	10.	11.	12.	13.	14.	15.	16.
4			2	5		37	
28	8	3	5	49	19	8	7
0	4	1	10	8	8	9	6
45	6	52	4	10	27	10	58
5	71	12	60	9	7	28	3

17.	18.	19.	20.	21.	22.	23.	24.
	6			7			14
18	7	6	49	10	28	32	7
9	10	48	9	25	7	2	16
38	5	9	16	8	48	40	5
6	59	13	8	29	16	15	29

77. Further Study of Carrying in Addition. (Class Work.) There is nothing really new in this article, but there are some little "tricks" about carrying that you ought to be sure you know how to work.

Watch for these "tricks" so that you won't get caught on one of them. Read carefully, but do not be too slow.

FIRST TRICK

In examples like Example (*A*) below, with a zero in the ones' place in the answer, pupils sometimes make mistakes. Answer the questions about Example (*A*).

(*A*)	32
	4
	21
	23
	80

(*a*) What is the sum of the numbers in the ones' column?

(*b*) What number is written under the ones' column?

(*c*) What number is carried and added into the tens' column?

Some pupils think that because the sum of the ones' column is 10, they should write the 1 and forget the 0. You won't make this mistake, will you?

Look at the examples below and tell what to write in the ones' place in the answer and what to carry.

		2.	4				**5.**	19			
			21	**3.**	16			12		**6.**	9
1.	17		3		27	**4.**	18	9			8
	29		20		9		10	30			16
	14		12		18		34	20			37

Always write the ones under the ones' column and carry the tens into the tens' column.

SECOND TRICK

The answer to Example (*B*) is different from any that you have had for addition. Study it carefully and answer the questions asked about it.

(*B*)	22
	61
	43
	126

(*a*) Can you tell two ways in which the answer for Example (*B*) is different from the answer for Example (*A*) on page 98?

(*b*) Do you have to carry to get the answer in Example (*B*)?

(*c*) Tell why there are three figures in the answer.

In Example (*B*), John Baynes forgot and carried a 1 into the tens' column. Was his answer right? What do you think John got for his answer?

John took a quick test one day, and he made other mistakes. Sometimes he forgot to "carry." Below is the test, with his answers. Some of the answers are right and some are wrong.

Find the answers that are wrong and be ready to tell what John's mistakes were. Check your work.

1.		2.		3.	4.	5.	6.		7.
35				4	4	21	41		
16		23		19	51	56	42		13
42		31		32	23	30	53		23
23		82		25	60	42	81		14
116		146		60	138	159	217		41

THIRD TRICK

Look at the sum in Example (*B*) on page 99. It has three figures in the sum. The three figures are 1, 2, 6. The sum in Example (*C*) below also has three figures, but the center figure is zero. Don't let an example like this catch you.

(*C*)	24
	35
	48
	107

(*a*) What is the sum of the ones?

(*b*) Tell why the zero is in this sum of the example.

FOURTH TRICK

The answer is not given for Example (*D*) below. Can you find out what the answer is?

(*D*)	64
	80
	56

(*a*) Put a piece of paper under Example (*D*) and add.

(*b*) What is the first figure you write down?

(*c*) What is the sum? How many zeros in the sum?

Be careful in examples like (*D*) with **two zeros** in the sum.

FIFTH TRICK

(*E*)	48
	39
	56
	43
	176

Can you do Example (*E*) without making any mistakes? Try it.

(*a*) What is the sum of the ones?

(*b*) What number is carried and added into the tens' column?

(*c*) Is 176 the correct sum?

Be careful in adding examples like (*E*). The sum of the ones is 26. Write the **6** and carry the **2**. Can you answer the questions below?

1. How many tens in 26?

2. How many ones in 26?

3. In Example (*E*) under what column does the 6 of the 26 belong?

4. What becomes of the 2 of the 26?

> Remember to write the ones under the ones' column.

78. Review of Addition with Carrying. (Oral Work.) In the example at the right the sum of the ones is **24**. In adding the column we write 4 and carry the 2.

29
17
18

If the sum of the ones in an example is **15**, we write 5 and carry the 1.

If the sum of the ones in an example is **34**, we write 4 and carry the 3.

Think of the following numbers as sums of the ones in addition examples and tell what you would write and carry. In Example 1 you should say, "Write zero and carry 2."

(*A*) ORAL PRACTICE

1.	2.	3.	4.	5.	6.	7.	8.
20	*12*	*21*	*32*	*23*	*10*	*16*	*29*

The work below will give you practice on what you have learned about carrying and checking.

(*B*) WRITTEN PRACTICE

Add carefully and check your work:

1.	2.	3.	4.	5.	6.	7.	8.
5	70	93	66	9	49	40	68
90	80	8	8	42	8	59	0
49	70	60	7	69	57	85	77
86	90	42	73	5	38	77	59

9.	10.	11.	12.	13.	14.	15.	16.
					49		9
4	89	4	97		5	9	68
93	78	90	7	98	87	9	70
58	6	61	84	39	86	59	93
89	39	61	8	63	96	66	90

79. Further Practice in Addition with Carrying. (WRITTEN WORK.) If you made mistakes in the examples in Article 78, you should practice on the examples below and at the top of the next page.

EXERCISE

1.	2.	3.	4.	5.	6.	7.	8.
8	5	55	90	9	80	87	63
68	70	7	9	94	7	96	8
6	74	72	90	72	60	39	82
67	81	9	70	68	81	8	59

9.	10.	11.	12.	13.	14.	15.	16.
						68	99
9	70	60	58	92	76	7	4
38	75	0	8	7	97	9	6
76	57	90	87	53	88	9	99
9	79	24	7	90	49	34	13

80. Rapid Drill. (ORAL WORK.) See how quickly you can think out the answers. Study for ten minutes. Don't use pencil. Be ready to give the answers.

Subtract each lower number in the box from the one just above it. Begin with the example under the arrow, and just give each difference.

(*A*)

10	8	12	9	4	7
4	8	9	3	0	4

(*B*)

9	2	10	8	1	9
6	0	5	3	0	4

(*C*)

10	7	12	9	14	10
6	0	8	7	7	8

(*D*)

8	12	10	8	9	11
0	4	9	5	2	5

(*E*)

13	11	18	10	15	16
6	8	9	3	8	8

(*F*)

15	12	14	11	11	13
6	7	8	7	3	4

(*G*)

11	13	12	14	12	15
9	8	3	6	5	7

(*H*)

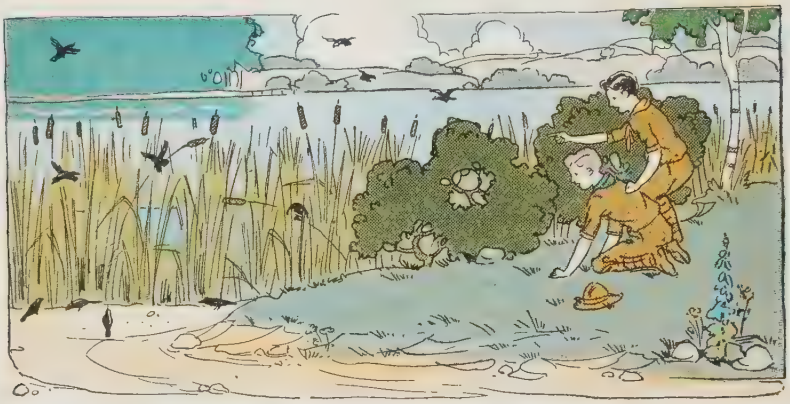
17	11	13	15	14	11
8	6	7	9	5	4

(*I*)

17	13	16	13	16	14
9	5	9	9	7	9

Give the answers:

1.	2.	3.	4.	5.	6.	7.	8.
18	56	53	49	59	38	47	29
−16	+32	−22	+47	−36	+49	−25	+46



81. Adding Three-Figure Numbers. (CLASS WORK.) Can you find the answer to the problem below without help? Try it.

1. Two boys counted blackbirds one day. John counted 126, and Ralph counted 139. How many blackbirds did both boys count?

The teacher will tell you if you got the correct answer. If your answer was right, you have remembered how to add large numbers. Would you like to try some harder examples?

Find the answers to the four examples below. Don't copy the examples. Just write the answers on your paper. The arrows point to the ones' columns.

2.	3.	4.	5.
139	143	528	238
158	217	17	9
		238	306
			139

☛ **Do you see that in Examples 1 to 5 on page 104 you should carry from the ones' column only?**

The next examples are a little different, but you can get the sums all right. You like to do things that are different, don't you? Notice that the arrows point to the **tens'** columns in these examples. Find the sums quickly. Add and carry when you need to.

6.	7.	8.	9.
272	583	484	466
163	395	90	170
		161	271
		180	

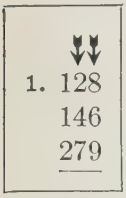
☛ **In Examples 6 to 9 above you should carry from the tens' column only.**

82. Double Carrying in Addition. (Class Work.) You have learned how to carry **once** in an addition example. If you can get the correct answer to Problem 1 below, you will prove that carrying **twice** in the same example isn't too hard for you.

1. During one day of clean-up week the children in the second grade dug up 128 dandelion plants, the children in the third grade dug up 146, and the children in the fourth grade dug up 279. How many dandelion plants did the children in these three grades dig up that day?

In working Problem 1, you must first put down the numbers to be added in a column. Be sure to

write the numbers in straight columns as shown at the left below.



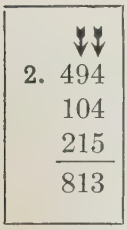
(*a*) Add the numbers in the ones' column. Write the 3 and carry the 2.

(*b*) Add the 2 to the numbers in the tens' column. The sum should be 15. This is something new. You must **carry again.** Write the 5 and carry the 1.

(*c*) Add the 1 to the other numbers in the hundreds' column.

(*d*) What is your answer? Remember that it is not only a **number.** It has a **name,** too. What is the name?

(*e*) If you did not get the right answer, raise your hand. A pupil who gets it right will be glad to go to the blackboard and show you how to do it.



Here is an example worked correctly. Select a pupil to add it aloud, and see if he gets the same sum.

Find the sums for the examples below. The arrows show where you must carry. Just write the answers on your paper.

3.	4.	5.	6.
387	227	123	297
65	428	306	288
489	183	456	96
		57	168

In each example above you should carry twice, once from the ones' column and once from the tens' column.

83. A Game of Adding with Zero in Tens' Column. (SILENT READING.) See if you can find out by reading the directions just how to play this game. Read carefully.

(*a*) Get paper and pencil ready for work.

(*b*) Wait for the teacher to say "Go!" Then put the paper just under Example 1 below and add, writing your answer on the paper.

(*c*) When you have finished Example 1, put up your hand and be quiet.

(*d*) When all the pupils have finished Example 1, the teacher will tell you to put your hand do n.

(*e*) She will then ask the one who finished first to write his answer on the blackboard.

(*f*) If the answer is not right, the teacher will say, "Erase it." If the answer is right, she will say, "Right."

(*g*) If your answer is not correct, ask the pupil at the blackboard to tell how to work the example.

(*h*) Get ready. Don't start until the teacher says, "Go!"

(*i*) Play the game with the other examples below.

(*j*) Ask questions now if you need to.

1.	2.	3.	4.	5.	6.	7.
				147		206
503	106	603	203	87	303	628
203	407	204	101	275	504	28
102	209	106	402	138	107	119

84. Practice in Adding Three-Figure Numbers. (Oral and Written Work.) Look at the examples below and tell what to write and what to carry. You can do it without a pencil. Speak so that all the pupils can hear you. The first pupil should add the ones and the next pupil the tens. Don't go too fast. Raise your hand if you hear a mistake.

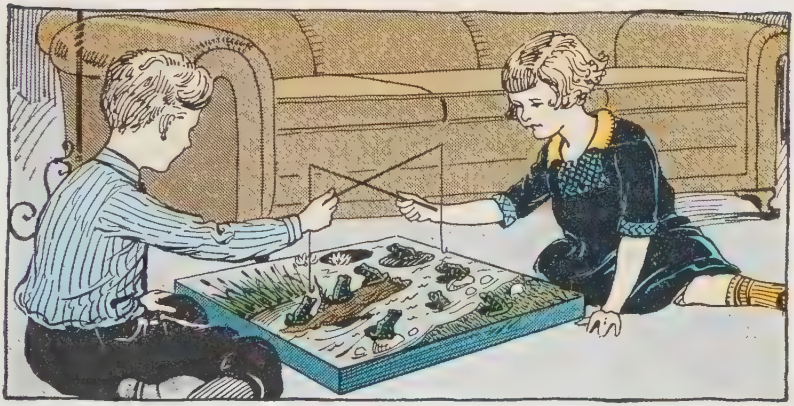
This is the way to do it: Look at the first example while the teacher adds the ones' column. She will say, "11, 20. Write the 0; carry the 2." The teacher will then ask a pupil to go on with the adding. Remembering the 2 to carry, the pupil will say, "9, 11, 19. Write the 9 and carry the 1." Keep wide awake or you will miss something.

After you have done the work aloud, add the examples. Check your work.

EXERCISE

1.	2.	3.	4.	5.	6.	7.
	103	88	280		309	102
189	9	37	60		56	1
27	106	86	560	523	508	603
774	205	597	40	178	30	103

8.	9.	10.	11.	12.	13.	14.
387	95	86	94	184	53	369
99	496	97	73	72	155	14
442	74	73	659	581	45	33
69	286	69	78	79	568	559



85. Problems about a Frog-Pond Game. (WRITTEN WORK.) Marjorie had a frog-pond game. Each frog was numbered. It was counted for the one who fished it out first. Marjorie and Roy played three games.

	1st	*2d*	*3d*
Marjorie's Score	45	50	86
	19	38	45
	38	86	64

	1st	*2d*	*3d*
Roy's Score	64	45	50
	50	64	38
	85	19	19

1. What was Marjorie's score the first game?
2. What was Roy's score the first game?
3. Who won the first game?
4. What was Marjorie's score the second game?
5. What was Roy's score the second game?
6. Who won the second game?
7. What was Marjorie's score the third game?
8. What was Roy's score the third game?
9. Who won the third game?

86. Extra Practice with Carrying. (WRITTEN WORK.) If you have been making mistakes in adding, practice on Examples 1 to 21 in this article. Take a row at a time, placing a paper under the examples so that you can write the sums on it.

Perhaps you should take your book home and practice on these examples. If you are making many mistakes, you are not so good at arithmetic as you ought to be. Practice will help you. Work hard.

EXERCISE

1.	2.	3.	4.	5.	6.	7.
			93	67	35	296
447	97		368	759	400	77
52	98	503	66	4	51	276
259	95	489	384	89	352	99

8.	9.	10.	11.	12.	13.	14.
79				68		89
18	379	36	98	564	29	77
69	79	339	55	277	187	95
98	309	404	83	60	87	54
19	96	17	87	3	307	96

15.	16.	17.	18.	19.	20.	21.
24	58		19	87		97
85	99	146	28	68	457	65
96	48	75	8	67	97	96
66	38	145	109	32	269	66
57	60	67	807	78	98	89

UNITED STATES MONEY

87. Money. (CLASS WORK.) Can you answer these questions about money?

1. How many cents are worth a nickel?
2. A dime is how many cents?
3. How many cents are worth two dimes?
4. How many cents are worth a quarter?
5. How many dimes and nickels in a quarter?
6. Look at the box at the right. Can you tell how much the scooter would cost?

SCOOTER
$4.39

$4.39 is read "4 dollars and 39 cents."

$4.39 is the **price** of the scooter.

7. $ is called the **dollar sign.** Can you find it in the price of the scooter? Make it on the blackboard.

8. Do you see the dot between the 4 and the 39 in $4.39? This dot is used to separate the dollars from the cents. We call it the **cents' point.** Choose a pupil to write $4.39 on the blackboard.

9. What would it cost to buy the stove? The doll?
10. What is the price of the windmill? Of the drum?

1 dollar = 100¢. **One half-dollar = 50¢.** **Two quarters = 50¢.**

Read aloud the following amounts of money:

11.	12.	13.	14.
\$ 8.43	\$ 9.20	\$ 4.00	\$7.01
\$ 6.44	\$10.50	\$30.00	\$1.08
\$12.76	\$ 7.05	\$20.09	\$8.00
\$25.35	\$10.05	\$20.50	\$1.00

15. \$.65 **16.** 30¢ **17.** \$.03 **18.** 10¢.

If there are no dollars to write, cents may be written without the dollar sign and the point. "Sixty-five cents" may be written \$.65 or 65¢. "Four cents" may be written \$.04 or 4¢.

88. Writing Dollars and Cents. (WRITTEN WORK.) See if you can change the words below into figures and signs. Don't forget the cents' point.

Write in figures:

1. Seven dollars and thirty-five cents.
2. Four dollars.
3. Twelve dollars and fifteen cents.
4. Twenty-three dollars and twenty-three cents.
5. Write forty-seven cents in two ways.
6. Two dollars and five cents.
7. Twenty-one dollars and six cents.
8. Write sixty cents in two ways.

89. How to Add Dollars and Cents. (CLASS WORK.) You must be sure that you can make straight columns and watch the dollar sign and cents' point if you want to do good work with dollars and cents.

1. What would it cost to buy a scooter at $4.39 and a windmill at $1.48? The work below shows you how to find the cost.

$4.39	(for scooter)
1.48	(for windmill)
$5.87	

HINTS: (*a*) You have added harder numbers than these.

(*b*) In these numbers you must be careful about the cents' point.

(*c*) Write $ before the answer.

(*d*) In writing dollars and cents to be added, always put dollars over dollars and cents over cents. This means that the cents' points will be in a straight line.

Look at the examples at the right. In which one are the cents' points in a straight line?

Right	Wrong
$6.43	$7.92
7.36	3.46
4.24	5.32
3.40	8.63

Find the cost of these toys. Get the prices from page 111.

2. A toy stove and a doll.

3. A windmill and a drum.

4. A scooter, a toy stove, and a doll.

5. A drum, a windmill, and a scooter.

6. What would all of these toys cost?

90. Practice in Adding Dollars and Cents. (WRITTEN WORK.) In these examples, **check your work** if you are not quite sure it is correct. In writing columns of dollars and cents, put the dollar sign before the first number only.

EXERCISE

1.	2.	3.	4.	5.
$5.55	$3.79	$1.09	$5.78	$2.00
3.27	.67	1.09	5.86	4.00
1.74	5.69	1.03	8.29	9.00

6.	7.	8.	9.	10.
$8.00	$4.70	$1.73	$3.59	$4.55
7.90	.88	4.36	2.27	9.65
5.80	4.63	1.43	2.78	6.08

EXTRA PRACTICE FOR GOOD WORKERS

11.	12.	13.	14.	15.
$1.91		$1.24	$ .37	$ .25
2.63	$6.35	7.61	.38	7.53
4.00	1.00	6.00	.69	.63
7.56	6.79	1.43	.46	6.36

16.	17.	18.	19.	20.
$8.00		$2.65		$1.77
6.00	$9.03	3.48	$4.88	1.08
2.00	8.07	2.57	.43	1.07
7.00	8.05	4.98	4.65	4.02
6.00	9.08	3.86	5.17	2.59

91. Rapid Drill. (CLASS WORK.) Every time you come to one of these big boxes with examples in it, be sure to work hard so that you can give the answers quickly and without a mistake. If you can do this, the work ahead will be easier for you. Study for ten minutes and then be ready to give the answers.

	(A)	(B)	(C)	(D)	(E)	(F)
1.	24 −13	6+8+7	69 −25	7+6+7	14−6	17 −9
2.	9+9+8	38 −34	35+6	13 −8	8+9+6	18−9
3.	58 −45	8+7+8	79 −23	11−7	4+9+8	16 −7
4.	12−6	17+0	39−7	13 −7	14+8+9	12−3
5.	2 +64	14 −8	56+7	15−6	10 −7	39+9
6.	13−4	27+8	47 −43	27 +57	10−3	26−6
7.	9+7+4	11−2	8+3+9	68 −32	16 +76	10−2

SUMMARY

92. General Review. (Written Work.) The examples and questions below will give you a chance to show that you have been working on your arithmetic. Be sure to do neat work.

Write in figures:

1. three hundred twenty-eight.
2. five hundred ninety.
3. seven hundred seven.
4. twenty-four dollars and forty-two cents.
5. Is four hundred five less than four hundred twenty-two?
6. Add 23 and 46 and subtract 26 from the sum.
7. Find the sum of 7, 62, 9, and 43 and check the answer.
8. Find the difference of ninety-six cents and seven cents.
9. 226 and how many more are 769? Check your answer.
10. What does Article 66 tell you about?
11. Find the sum of one hundred forty-six, seventy-five, and three hundred nine.

Copy the examples and answers on page 117. If the answer is correct, put a "C" beside it. If it is not correct, draw a line through the number that is wrong. Then write the correct number. Samples (*a*) and (*b*) on page 117 show you how to do this.

Samples

(*a*)

389
−162
227 C

(*b*)

42
31
49
28
~~140~~
150

12.

625
−403
278

13.

7
69
70
30
146

14.

479
−244
235

15.

26
3
48
29
107

16.

688
−230
448

17.

70
48
48
5
191

18.

799
−108
681

19.

9
40
36
47
142

20.

605
−302
303

CHAPTER V

BORROWING OR CARRYING IN SUBTRACTION. CHECKING SUBTRACTION. THE SELF-TESTING DRILLS.

93. Subtracting Dollars and Cents. (CLASS WORK.) Would you know how to find the difference in the cost of the windmill and the drum shown on page 111? Cost of drum is \$2.98; cost of windmill is \$1.48.

This is the way to find the difference. You should subtract \$1.48 from \$2.98. To do this write dollars under dollars and cents under cents. Then subtract.

\$2.98
1.48
\$1.50, difference

(*a*) Subtract just as you would if the numbers were smaller.

(*b*) Be sure to put the point in the right place in the answer and to write the dollar sign.

(*c*) Tell how these numbers were subtracted.

(*d*) What does \$1.50 tell you?

Ask a pupil to go to the blackboard and show how to subtract \$2.45 from \$4.79.

94. Practice in Subtracting Dollars and Cents. (WRITTEN WORK.) Find the differences in the examples below and on the next page.

1.	**2.**	**3.**	**4.**	**5.**
\$5.48	\$8.57	\$9.68	\$7.89	\$8.06
2.04	.35	3.22	.76	5.04

6. Subtract \$3.55 from \$4.79.

7. How much must be added to \$2.76 to make \$8.99?

8. What is the difference of \$5.32 and \$9.69?

9. \$8.78 − \$4.32 = ...

10. \$7.76 minus \$2.63 = ...

11. If you have \$6.75 and spend \$3.50, how much have you left?

➤➤Notice that Examples 5 to 11 are all different ways of writing examples or problems in subtraction.

BORROWING IN SUBTRACTION

95. Getting Ready for Harder Subtraction—Borrowing Method. (Class Work.) Answer the questions and tell what belongs on each blank in this article.

1. How many cents make a dime?

2. How many dimes make 40 cents?

3. 32 cents is 3 dimes and ..... cents.

4. 48 cents is 4 dimes and ..... cents.

5. 29 cents is 9 cents and ..... dimes.

6. 64 cents is 4 cents and ..... dimes.

7. 5 dimes and 1 cent are ..... cents.

8. 1 dime and 6 cents are ..... cents.

9. 8 dimes and 0 cents are ..... cents.

10. Take 1 dime from 6 dimes. How many dimes are left?

11. Take 1 dime from 3 dimes. How many dimes are left?

12. Take 1 dime from 4 dimes and 7 cents. How many dimes and cents are left?

13. Take 1 dime from 5 dimes and 2 cents. How many dimes and cents are left?

14. Subtract 1 dime from 8 dimes. What is the difference?

Subtract and give the differences:

15.	**16.**	**17.**
6 dimes 4 cents	8 dimes 5 cents	5 dimes 7 cents
3 dimes 2 cents	3 dimes 4 cents	2 dimes 4 cents

18. Add 1 dime to 2 cents. How many cents?

19. Add 1 dime to 6 cents. How many cents?

20. Add 1 dime to 0 cents. How many cents?

21. Add 1 dime to 1 cent. How many cents?

22. 36 is ..... tens and ..... ones.

23. 28 is ..... ones and ..... tens.

24. 17 is 7 ones and .....ten.

25. 43 is 3 ones and ..... tens.

26. Subtract 4 ones from 36. What is the answer?

27. Take 1 ten from 4 tens and 7 ones.

Subtract and give the differences:

28.	29.	30.
4 tens 7 ones	6 tens 4 ones	7 tens 8 ones
2 tens 3 ones	5 tens 1 one	4 tens 2 ones

31. Add 1 ten to 2 ones. How many ones?

32. Add 1 ten to 6 ones. How many ones?

Read:

(*a*) 28 cents is 2 dimes and 8 cents, because

2 dimes = 20¢
8 cents = 8¢
The sum is 28¢

(*b*) 28 cents is also 1 dime and 18 cents, because

1 dime = 10¢
18 cents = 18¢
The sum is 28¢

(*c*) 42 cents is 4 dimes and 2 cents. If we take 1 dime from the 4 dimes and add it to the 2 cents, we get:

3 dimes and 12 cents.

(*d*) Does 42 cents also equal 3 dimes and 12 cents?

Tell what belongs on each blank below:

33. 34¢ = { 3 dimes and ..... cents
or
2 dimes and ..... cents }

34. 47¢ = 4 dimes and ..... cents or 3 dimes and ..... cents.

35. 54¢ = ... dimes and 4 cents or ..... dimes and 14 cents.

36. 37¢ = 3 dimes and ..... cents or 2 dimes and ..... cents.

37. 65¢ = ... dimes and 5 cents or ..... dimes and 15 cents.

38. 23 = 2 tens and ..... ones or 1 ten and ..... ones.

39. 36 = ... tens and 16 ones.

40. 49 = 3 tens and ..... ones.

41. 58 = ... tens and 18 ones.

Do you see that you may think of numbers in different forms? Thus:

36 may be thought of as 3 tens and 6 ones. This is often needed in addition.

36 may be thought of as 2 tens and 16 ones. This is often needed in subtraction.

Give the numbers that belong on the dotted lines:

42. 62 = 6 tens and ..... ones.

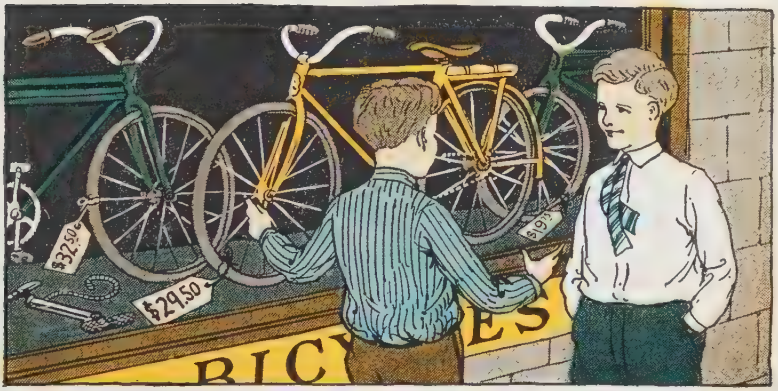
43. 62 = 5 tens and ..... ones.

44. 81 = 7 tens and ..... ones.

45. 77 = ... tens and 17 ones.

46. 10 = ... tens and 10 ones.

47. 15 = 0 tens and ..... ones.



96. Problems about Joe's Bicycle. (WRITTEN WORK.) Try hard to get correct answers to these five problems.

1. Joe wanted a bicycle. He had $15.50 in the bank. April 8th was his birthday. He asked his family to give him money so that he could save for his bicycle. His father gave him three dollars, his mother gave him two dollars, and his brother gave him one dollar. He put this money in the bank. How much did he get from his family for his birthday?

2. How much did he have in the bank then?

3. Joe delivered for a drug store. He was paid $1.50 a week. How much did he earn in four weeks?

4. When he was paid for working four weeks, he put that money in the bank, too. How much did he have in the bank then?

5. The bicycle which Joe wanted cost $29.50. How much more money did he need to save?

97. Harder Subtraction with Borrowing. (CLASS WORK.) Try hard to understand this article.

Jack wanted to buy a bicycle bell. The bell cost 62¢. He had only 38¢. How many more cents did he need?

To find out, think 38¢ from 62¢ in this way:

62¢ equals 6 dimes and 2 cents

38¢ equals 3 dimes and 8 cents

Notice that 8 cents cannot be subtracted from 2 cents. Let us take, or borrow, a dime from the 6 dimes, change it into 10 cents, and add them to the 2 cents. Then the picture looks like this:

5 dimes and 12 cents

3 dimes and 8 cents

We now have only 5 dimes in the upper number, because we have taken 1 dime away from the 6 dimes. But we have 12 cents in the upper number, because we added the 1 dime or 10 cents to the 2 cents. Do you see that both figures in the lower number are smaller than the ones above them? Now we can subtract. You have subtracted these numbers before, haven't you?

5 dimes	12 cents
−3 dimes	8 cents
2 dimes	4 cents

The example below shows how the example looks when you write it for subtraction.

Can 62¢ be thought of as 5 dimes and 12 cents? This is the way to say it when you subtract:

1.	
62	cents
38	cents
24	cents

8 from 12 is 4. Write the 4.
3 from **5** is 2. Write the 2.

The answer is 24 cents. So Jack needs 24 more cents.

You know that you can always subtract a smaller number from a larger one. You have learned that sometimes this can be done only by changing the upper number so that it becomes larger.

Look at Example 2, below. Do you understand how the upper number is changed so that the lower one can be subtracted? First of all, you must take one dime and change it to 10 cents. Then add the 10 cents to the 3 cents so that you can subtract.

2. Subtract 25¢ from 43¢.

43¢ = 4 dimes and 3 cents
25¢ = 2 dimes and 5 cents
18¢

Change to

3 dimes and 13 cents
2 dimes and 5 cents
1 dime 8 cents
18¢

This is the way to say it:

5 from 13 is 8; write the 8. 2 from 3 is 1; write the 1.

Does changing 43¢ to 3 dimes and 13¢ help us to subtract?

How would you work Example 3 below?

3. 90
−36

(*a*) Does 90 = 8 tens and 10 ones?
(*b*) 6 from 10 is ? 3 from **8** is 5; write the 5.
(*c*) Why do we subtract 3 from 8 instead of from 9?
(*d*) What is the answer to this example?

If you cannot subtract a number from the one above it, think of the upper number as though it had a *1* before it. Then subtract, but remember that you took the *1* from the number just to the left.

4.
57 = $4^{1}7$
−38 −38

To subtract in Example 4, you take 1 from the 5 and put it before the 7, making 17. Now you can subtract. Remember that when you do this, the 5 becomes 4. Tell what the answer is.

5. 71
−45

(*a*) To what number should you increase the **1** in Example 5 if you wish to subtract?
(*b*) What does the 7 become?
(*c*) What is the answer to this example?

6. 60
−32

(*a*) To what number should you increase the **0** in Example 6 if you wish to subtract?
(*b*) What does the 6 become?
(*c*) What is the answer to Example 6?

Tell what the upper numbers become when you subtract in each of the examples below. For Example 7 say, "3 becomes 13, and 5 becomes 4."

7. 53	**8.** 72	**9.** 65	**10.** 46	**11.** 67	**12.** 88	**13.** 60
−26	−46	−39	−29	−38	−59	−28

98. Practice in Thinking Subtraction. (ORAL AND WRITTEN WORK.) In the examples below, tell how to subtract. If you don't know how to tell, look at Example 1 on page 125. In number 1 below you should say, "9 from **17** is 8. Write the 8. 4 from **5** is 1. Write the 1."

EXERCISE

1.	2.	3.	4.	5.	6.	7.
67	92	85	41	93	55	71
49	48	17	15	75	38	57

8.	9.	10.	11.	12.	13.	14.
53	42	73	63	35	74	64
16	25	29	47	17	18	17

Now work all 14 of the above examples.

AUSTRIAN METHOD

99. Getting Ready for Harder Subtraction—Austrian Method. (CLASS WORK.) Some of the examples below and on page 128 ask questions and some have blanks. Answer the questions and tell what belongs on each blank.

1. How many cents make a dime?
2. How many dimes make 40 cents?
3. 32 cents is 3 dimes and ..... cents.
4. 48 cents is ..... dimes and ..... cents.
5. 56 cents is ..... dimes and ..... cents.

6. 29 cents is 9 cents and ..... dimes.

7. 64 cents is ..... cents and ..... dimes.

8. 5 dimes and 1 cent are ..... cents.

9. 1 dime and 6 cents are ..... cents.

10. 8 dimes and 0 cents are ..... cents.

11. Add 1 dime to 2 cents. How many cents?

12. Add 1 dime to 6 cents. How many cents?

13. Add 1 dime to 0 cents. How many cents?

14. Add 1 dime to 1 cent. How many cents?

15. Add 1 dime to 4 cents. How many cents?

16. Add 1 dime to 7 cents. How many cents?

17. I have 3 dimes and 4 cents. If I add one of the dimes to the 4 cents, how many dimes and how many cents have I?

18. I have 6 dimes and 2 cents. If I add one of the dimes to the 2 cents, how many dimes and how many cents have I?

19. 36 is ..... tens and ..... ones.

20. 28 is 8 ones and ..... tens.

21. 32 is 2 ones and ..... tens.

22. 17 is 7 ones and ..... ten.

23. 43 is 3 ones and ..... tens.

24. 27 is 7 ones and ..... tens.

25. There are 4 tens and 6 ones. If I add one of the tens to the 6 ones, how many tens and ones are there?

100. Harder Subtraction—Austrian Method. (CLASS WORK.) Try hard to understand everything in this article.

Jack broke the bell on his bicycle and wanted to buy a new one. It cost 62¢. He had only 38¢. How many more cents did he need?

To find out how much more money Jack needed, you subtract 38¢ from 62¢. This is the way to do it.

1. 62¢ −38¢ 24¢	8 is more than 2; so you should think of the 2 as 12. Then think "8 and **4** are 12." Write the **4** and carry the 1 from 12. Add this **1** to the 3. Then think, "4 and **2** are 6." Write the **2**. The answer is 24 cents.

2. 90 −36 54	This is the way to work Example 2. 6 and **4** are 10. Write the **4** and carry the 1. 1 and 3 are 4. 4 and **5** are 9. Write the **5**.

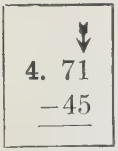
QUESTION: Why do we think of the 3 in 36 as a 4?

If you cannot subtract a number from the one above it, think of the upper number as though it had a *1* just before it. Whenever you do this, *carry* a *1* to the lower number in the next column to the left.

Thus:
62 $6^{1}2$
48 5 8

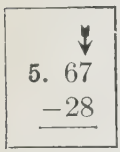
Study the next three examples.

3. ↓ 34 $3^{1}4$ 18 2 8	To subtract in Example 3, you increase the 4 to 14 so that you can subtract. Remember to carry and add the 1 to the lower number in the next column.



(*a*) To what number should you increase the **1** in Example 4?

(*b*) What does the 4 in 45 become?



(*a*) To what number should you increase the 7?

(*b*) What does the 2 in 28 become?

In order to subtract, to what should you increase the upper figures in the ones' columns of Examples 6 to 12?

6.	7.	8.	9.	10.	11.	12.
53	72	65	46	67	88	60
→26	→46	→39	→29	→38	→59	→28

In the examples below, tell how to subtract. If you don't know how to tell, look at Example 2. In Example 13 below you should think, "9 and 8 are 17. Write the 8 and carry the 1. 5 and 1 are 6. Write the 1."

13.	14.	15.	16.	17.	18.	19.
67	71	86	64	92	41	53
49	16	67	19	69	29	38

20.	21.	22.	23.	24.	25.	26.
81	30	94	82	97	76	81
15	26	46	68	68	58	28

Now work Examples 6 to 26 above.

101. Rapid Drill. (CLASS WORK.) Were the examples in the big boxes on pages 69 and 115 hard for you? If they were, turn back to them and practice after you have tried the examples below. That would be good home work.

Study the examples below for ten minutes without using your pencil. Be ready to give the answers when your teacher calls for them. Watch the signs. Try not to make a mistake if you are called on.

	(*A*)	(*B*)	(*C*)	(*D*)	(*E*)	(*F*)
1.	$24+9$	$15-7$	$32+8$	$17-9$	$8+8+6$	$13+3+9$
2.	$10-8$	$6+4+8$	$18-9$	$9+6+9$	$6+28$	$16-7$
3.	$24+6+5$	$67-24$	$9+5+8$	$65+18$	$15-6$	$9+4+8$
4.	$17-9$	$37+5$	$13-5$	$5+4+3$	$87-30$	$13+6+8$
5.	$16-9$	$25+6$	$79-35$	$16-9$	$45+36$	$24+58$
6.	$14-6$	$37+67$	$37+43$	$2+9+8$	$39+38$	$14-8$

CHECKING SUBTRACTION

102. How to Check Subtraction. (SILENT READING.) Did it help you to learn how to check your answers in addition? Would you like to know how to check your work in subtraction so that you will be pretty sure that it is correct? This article will tell you how to do it.

1.	5
	−3
	2

This example means that when 3 is subtracted from 5, 2 is left.

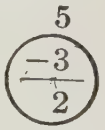
3 is the number subtracted.

2 is the number left. It is the answer or difference.

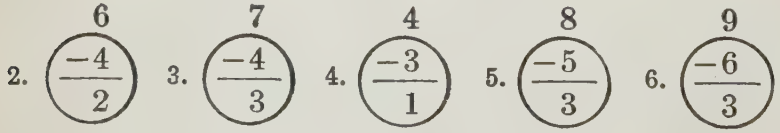
Let us put a circle around the 3 and 2 like this:

(*a*) Add the two numbers in the circle. The sum is 5.

(*b*) Do you see that when these two numbers are added, the sum equals the number above the circle?



Add the numbers in each circle below and see if the sum equals the number above the circle.



(*a*) The number above the circle is the number subtracted **from.**

(*b*) The number just above the straight line is the number **subtracted.**

(*c*) The number below the line is the number **left.**

When you add the number *subtracted* to the number *left*, the *sum* is the *number subtracted from*.

In subtraction, if you add the number just below the line to the number just above the line, the sum should equal the top number. When you do this, you "check" the answer in subtraction.

Let us see how we could check the example below. A third-grade pupil did the subtraction and got 33 for his answer.

Example

$$\begin{array}{r} 55 \\ -22 \\ \hline 33 \end{array}$$

22 is the number subtracted; **33** is the number left; the sum of these two numbers is **55**. Do you see that 55 is also the number at the top of the example? This shows the example was worked correctly.

$$\left.\begin{array}{r} 55 \\ -22 \\ \hline 33 \end{array}\right\} \textit{Add}$$

$$\underline{\quad 55 \quad}$$

Now study the example as it is shown at the right to see how to write the example when you check it.

Copy and check the answers to the following examples:

7.	8.	9.	10.	11.
$\begin{array}{r} 43 \\ -21 \\ \hline 22 \end{array}$	$\begin{array}{r} 61 \\ -46 \\ \hline 15 \end{array}$	$\begin{array}{r} 50 \\ -37 \\ \hline 13 \end{array}$	$\begin{array}{r} 82 \\ -57 \\ \hline 25 \end{array}$	$\begin{array}{r} 74 \\ -68 \\ \hline 6 \end{array}$

☛ Remember to check your answers in subtraction if you are not sure they are correct.

103. School Problems. (WRITTEN WORK.) Read very carefully or you will not get correct answers to these problems.

1. John's mother gave him a dollar bill for school supplies. He bought a notebook cover for 30 cents, a package of notebook paper for 7 cents, art supplies for 10 cents, a pencil for 2 cents, a spelling notebook for 5 cents, some penmanship paper for 3 cents, a penholder for 2 cents, and some pen points for 1 cent.

(*a*) How much did John's supplies cost?

(*b*) How much money should he have received in change for the bill?

2. Max drinks a half-pint of milk every day at school. It costs 3 cents a day for a half pint. How much does Max pay for milk each week at school?

3. Ellen drank just as much milk each week as Max. She brought 50 cents to pay for milk for a week.

(*a*) How much change should she have received?

(*b*) Show how she could prove that she received the right change.

4. Tom broke a window at school. His father asked him to pay for it with his own money. He had saved 90 cents and paid 38 cents for the glass he had broken. How much did he have left?

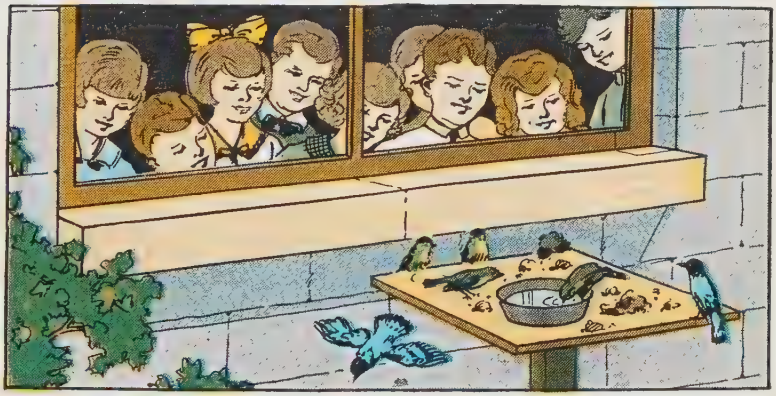
5. Eighty-two children came to the Robin Hood play. Of this number twenty-three took part.

(*a*) How many children were in the audience?

(*b*) Nine teachers and four parents came to see the

play. How many persons all together were in the audience?

6. In one school there was a room in which the costumes were kept. This school had 31 Indian costumes. Four, owned by children, were taken home. How many Indian costumes were left in the costume room?



The third grade of the Adams School made a feeding tray for winter birds. They called it their Bird Cafeteria. Monday they counted 2 nuthatches; Tuesday, 3 nuthatches and a woodpecker; Wednesday, a sparrow, 2 woodpeckers, and 4 chickadees; Thursday, a titmouse, 2 sparrows, and 3 chickadees; and Friday, 2 woodpeckers.

7. How many birds did they see at their cafeteria that week?

8. The children kept a list of all the birds, except sparrows, that they saw feeding on the tray. How many did they put on their list for the first week?

EXTRA PROBLEMS FOR GOOD WORKERS

9. The third-grade teacher received 36 spelling notebooks to sell to the children in her grade. Nineteen children each bought one the first day. How many of these spelling notebooks did the teacher have left to sell?

10. Ted had 65¢ saved in a small bank at home. He took out 25¢ to pay his Red Cross dues. How much did he have left in his bank?

11. Grace wanted to see the moving-picture show "Peter Pan." Her mother was going in the evening. It cost 15¢ to go in the afternoon and 30¢ to go at night. How much did Grace save by going with some other children in the afternoon instead of going with her mother at night?

12. Frances missed only four out of twenty examples in an arithmetic test. How many did she have correct?

13. Alice bought her own ticket to ride on the train to her grandmother's. It cost $2.40. She gave a five-dollar bill to the ticket agent. How much change should she have received?

Are you remembering these three things?

1. **To read all problems very carefully.**
2. **To estimate an answer before you work the problem.**
3. **To decide whether your answers are reasonable ones.**

104. Extra Practice on Harder Subtraction. (WRITTEN WORK.) Copy and subtract in the examples below. Check your work.

EXERCISE

1.	2.	3.	4.	5.	6.	7.	8.
61	80	63	99	60	42	65	84
44	55	38	24	44	17	27	55
9.	**10.**	**11.**	**12.**	**13.**	**14.**	**15.**	**16.**
96	73	53	54	90	42	83	90
47	19	27	36	36	25	64	21
17.	**18.**	**19.**	**20.**	**21.**	**22.**	**23.**	**24.**
53	52	77	72	98	72	82	91
15	43	59	36	59	38	19	58
25.	**26.**	**27.**	**28.**	**29.**	**30.**	**31.**	**32.**
37	61	70	31	87	21	80	90
19	59	32	27	18	15	47	38
33.	**34.**	**35.**	**36.**	**37.**	**38.**	**39.**	**40.**
91	81	85	81	94	82	94	70
16	32	68	23	67	74	89	69
41.	**42.**	**43.**	**44.**	**45.**	**46.**	**47.**	**48.**
58	95	74	43	65	80	96	46
39	19	49	36	16	23	78	39

SUBTRACTION WITH LARGER NUMBERS

105. Some Lower Figures Smaller Than Upper Figures. Zeros. (WRITTEN WORK.) Study the sample. Then copy and subtract in the examples below. Check your work.

Sample
395
21
374

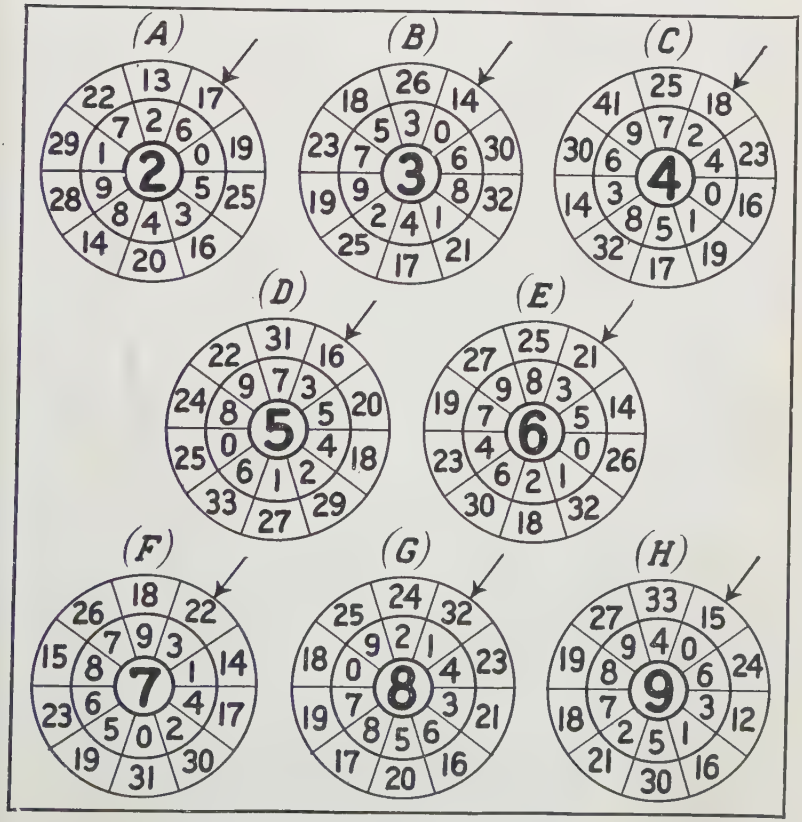
Don't let an example like this one bother you. When there are two figures in the lower number and three figures in the upper number, you subtract just as you would if there were three figures in the number below. In the sample there is nothing to subtract from the 3; so you write it in the answer.

EXERCISE

1.	2.	3.	4.	5.	6.	7.
325	245	486	487	567	667	434
312	21	442	22	535	51	124
8.	**9.**	**10.**	**11.**	**12.**	**13.**	**14.**
327	479	515	896	548	632	635
123	169	113	346	245	120	405
15.	**16.**	**17.**	**18.**	**19.**	**20.**	**21.**
991	987	985	676	307	633	709
530	407	610	306	104	433	507
22.	**23.**	**24.**	**25.**	**26.**	**27.**	**28.**
501	809	758	240	209	690	179
301	508	358	120	202	230	175

106. Review of Addition Facts. (CLASS WORK.) Give the sums in the wheels below. Add the number in the center to each number around it. Start where the arrow points and go around to the right. Just give the answers.

You would say the answers this way for Circle (*A*): 8, 19, 2, 21, and so on. Raise your hand if you hear a mistake.



BORROWING IN SUBTRACTION

107. Some Lower Figures Larger Than Upper Figures. No Zeros. (WRITTEN WORK.) Can you work these problems and examples?

1. A man was carrying sacks of flour out of a car. When he started to work in the morning, there were 326 sacks of flour in the car. By noon he had carried out 152. How many were left in the car?

HINTS: (*a*) You can get the answer if you remember what you have already studied about subtraction.

(*b*) Write these numbers on a piece of paper.

(*c*) To subtract 2 from 6 is easy. Do it.

(*d*) Now be careful. Do you know what to do in the tens' column?

(*e*) When you make the last subtraction, remember what to do in the hundreds' column.

(*f*) Name your answer; then check it.

Subtract:

2.	**3.**	**4.**	**5.**	**6.**	**7.**
$6.17	$7.49	$8.38	874	779	967
2.34	3.62	4.53	264	495	572

8. A girl wanted to buy a doll that cost $3.45. She had only $2.28. How much more money did she need?

HINTS: (*a*) On your paper put the right figures where the blanks are.

(*b*) Remember what to do with the cents' points and the $.

(*c*) Look out for the first subtraction.

(*d*) What is your answer? Did you remember the $?

Subtract:

9.	10.	11.	12.	13.	14.
\$9.83	981	\$7.79	993	\$6.95	966
6.34	956	1.24	617	5.48	739

108. Double Borrowing in Subtraction. (CLASS WORK.) Do you remember that in adding you sometimes had to **carry** more than once in the same example?

Sometimes you have to borrow more than once in subtraction examples. You need to know how to borrow more than once in getting the answer to the problem below.

1. A fat man in a circus weighs 536 pounds. Fred's father weighs 189 pounds. How much more than Fred's father does the fat man weigh?

This is the way to work the problem:

Borrow Twice

536
189
347
pounds

(*a*) Take 1, or borrow, from the 3 and increase the 6 to 16.

(*b*) 9 from 16 leaves 7. Write the 7.

(*c*) Remember that you took 1 away from the 3, leaving only **2** where the 3 is in the example at the left.

$$\begin{array}{r} 5\ 2^{1}6 \\ 1\ 8\ 9 \\ \hline 7 \end{array}$$

(*d*) Take 1 from the 5 and increase the 2 to 12.

(*e*) 8 from 12 leaves 4. Write the 4.

(*f*) You took 1 from the 5, leaving it a 4.

(*g*) 1 from 4 leaves 3. Write the 3.

$$\begin{array}{r} 4^{1}2^{1}6 \\ 1\ 8\ 9 \\ \hline 3\ 4\ 7 \end{array}$$

(*h*) Check to see if the answer is correct.

2. Find the difference of 302 and 195.

☛ This is a harder example than Number 1. Watch carefully, so that you will understand how to work it.

Be careful as you read these hints:

Borrow Twice
302
195
107

HINTS: (*a*) 5 cannot be subtracted from 2; so the 2 must be increased to 12.
This is the way to get the 12.
(*b*) Take 1 from the 3 and increase the 0 to 10.
(*c*) The 3 has now become a 2.

$$\begin{array}{r} 2^{1}0\ 2 \\ 1\ 9\ 5 \\ \hline \end{array}$$

(*d*) Take 1 from the 10 and think of the 2 as 12.
(*e*) The 10 has now become a 9.
(*f*) 5 from 12 leaves 7. Write the 7.
(*g*) 9 from 9 leaves 0. Write the 0.
(*h*) 1 from 2 leaves 1. Write the 1.

$$\begin{array}{r} 2\ 9^{1}2 \\ 1\ 9\ 5 \\ \hline 1\ 0\ 7 \end{array}$$

3. Subtract 198 from 407.

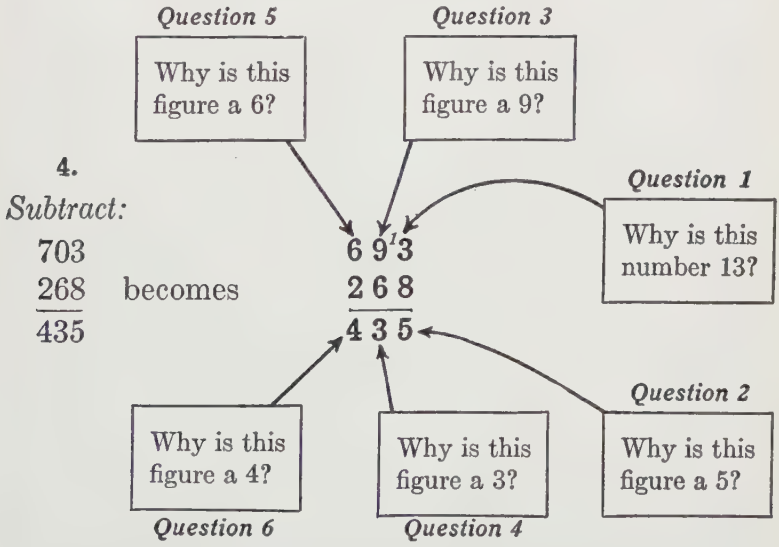
This example is the same kind of "trick" as Example 2.

$$\begin{array}{r} 407 \\ 198 \\ \hline \end{array} \quad \text{becomes} \quad \begin{array}{r} 3^{1}0\ 7 \\ 1\ 9\ 8 \\ \hline \end{array} \quad \text{becomes} \quad \begin{array}{r} 3\ 9^{1}7 \\ 1\ 9\ 8 \\ \hline 2\ 0\ 9 \end{array}$$

Do you see that in order to increase 7 to 17 it was necessary to take 1 from the 4 and put it before the 0, making it 10? Then 1 was taken from the 10 to make the 7 a 17.

When you subtract in examples like numbers 2 and 3, you must remember that the 0 becomes a 9 and that the left-hand figure becomes 1 less.

Answer the questions in the boxes. Take Question 1 first; then Question 2, and so on.



Tell how to get the answers for the examples below.

(A)	(B)	(C)
504 196 308	663 588 75	500 304 196

109. Practice in Double-Borrowing Subtraction. (WRITTEN WORK.) Copy these examples and subtract. Watch your work very carefully. In most of the examples you will need to borrow twice, but not in all of them.

EXERCISE

1.	2.	3.	4.	5.	6.
623	672	814	804	966	700
446	187	308	37	599	405
7.	**8.**	**9.**	**10.**	**11.**	**12.**
923	708	812	929	728	802
79	302	538	467	389	699
13.	**14.**	**15.**	**16.**	**17.**	**18.**
$7.20	411	$6.07	556	600	874
2.97	212	2.87	267	306	65

AUSTRIAN SUBTRACTION

110. Double Carrying in Subtraction (Austrian Method). (CLASS WORK.) Do you remember that in adding you sometimes had to carry more than once in the same example? Sometimes you have to carry more than once in subtraction examples, too. You need to know how to do this in getting the answer to the problem at the top of the next page.

1. A fat man in a circus weighs 536 pounds. Fred's father weighs 189 pounds. How much more than Fred's father does the fat man weigh?

This is the way to work the problem:

Carry Twice

536
189
347
pounds

(*a*) Increase the 6 to 16.
(*b*) 9 and 7 are 16. Write the 7 and carry the 1 to the 8, making it a 9.

$$\begin{array}{r} 5\ 3^{1}6 \\ 1\ 8\ 9 \\ \hline (9) \\ \hline 7 \end{array}$$

(*c*) Increase the 3 to 13.
(*d*) 9 and 4 are 13. Write the 4 and carry the 1 to the 1 in the lower number, making it a 2.

$$\begin{array}{r} 5^{1}3^{1}6 \\ 1\ 8\ 9 \\ \hline (2)(9) \\ \hline \end{array}$$

(*e*) 2 and 3 are 5. Write the 3. → 3 4 7

2. Find the difference of 302 and 195.

This is a harder example than number 1. Watch closely, so that you will understand how to work it. Be careful as you read these hints.

Carry Twice

302
195
107

(*a*) Increase the 2 to 12.
(*b*) 5 and 7 are 12. Write the 7 and carry the 1 to the 9, making it 10.

$$\begin{array}{r} 3\ 0^{1}2 \\ 1\ 9\ 5 \\ \hline (10) \\ \hline 7 \end{array}$$

(*c*) Increase the 0 to 10.
(*d*) 10 and 0 are 10. Write the 0 and carry 1 to the 1, making it a 2.

$$\begin{array}{r} 3^{1}0^{1}2 \\ 2\ 9\ 5 \\ \hline (10) \\ \hline \end{array}$$

(*e*) 2 and 1 are 3. Write the 1. → 1 0 7

3. Subtract 198 from 407.

This is the same kind of "trick" as number 2.

$$\begin{array}{r} 407 \\ 198 \\ \hline \end{array} \quad \text{becomes} \quad \begin{array}{r} 4\ 0^{1}7 \\ 1\ 9\ 8 \\ \hline \end{array} \quad \text{becomes} \quad \begin{array}{r} 4\ {}^{1}0\ {}^{1}7 \\ 1\ 9\ 8 \\ (2)(10) \\ \hline 2\ 0\ 9 \end{array}$$

Do you see that when you increase the 7 to 17 and subtract, you must increase 9 to 10? When you increase 0 to 10 and subtract, you increase the 1 to 2.

☛ **In examples like numbers 2 and 3, remember that you must carry twice and that 10 and 0 are 10.**

Answer the questions in the boxes below.

4. *Subtract:*

$$\begin{array}{r} 703 \\ 268 \\ \hline 435 \end{array}$$

becomes

$$\begin{array}{r} 7\ {}^{1}0\ {}^{1}3 \\ 2\ 6\ 8 \\ (3)(7) \\ \hline 4\ 3\ 5 \end{array}$$

Question 5
Why is this figure a 3?

Question 3
Why is this number a 10?

Question 1
Why is this number 13?

Question 6
Why is this figure a 4?

Question 4
Why is this figure a 3?

Question 2
Why is this figure a 5?

Tell how to get the answers for the examples below.

(*A*) $\begin{array}{r} 504 \\ 196 \\ \hline 308 \end{array}$ (*B*) $\begin{array}{r} 663 \\ 588 \\ \hline 75 \end{array}$ (*C*) $\begin{array}{r} 500 \\ 304 \\ \hline 196 \end{array}$

111. Practice in Double-Carrying Subtraction. (WRITTEN WORK.) Copy these examples and subtract. Watch carefully. In most of the examples you will need to carry twice, but not in all of them.

EXERCISE

1.	2.	3.	4.	5.	6.
623	672	814	804	966	700
446	187	308	37	589	405
7.	**8.**	**9.**	**10.**	**11.**	**12.**
923	708	812	929	728	802
79	302	538	467	389	699
13.	**14.**	**15.**	**16.**	**17.**	**18.**
$7.20	411	$6.07	556	600	874
2.97	212	2.87	267	306	65

GENERAL PRACTICE IN SUBTRACTION

112. Practice in Subtraction. (WRITTEN WORK.) Practice subtraction with the examples on the next page. Lay the edge of your paper under each row and write your answers on the paper. Work as fast as you can, but be careful. Take a row at a time, working across the page. When you finish a row, raise your hand.

When all the pupils have finished the row, the teacher will read the answers. She will tell you how to mark your answers that are wrong. Then fold your paper

and get ready for the next row. Don't start until the teacher says, "Go!" If you are not sure of your answers, check your work.

EXERCISE

Subtract:

1.	2.	3.	4.	5.	6.
453	656	557	866	858	972
364	557	499	596	596	582
7.	**8.**	**9.**	**10.**	**11.**	**12.**
988	825	965	960	850	740
479	316	258	680	490	380
13.	**14.**	**15.**	**16.**	**17.**	**18.**
806	703	907	603	507	609
236	573	247	390	190	290
19.	**20.**	**21.**	**22.**	**23.**	**24.**
704	803	902	930	510	320
497	695	797	890	470	230
25.	**26.**	**27.**	**28.**	**29.**	**30.**
920	470	240	613	911	912
911	466	232	208	306	505
31.	**32.**	**33.**	**34.**	**35.**	**36.**
900	200	800	603	901	802
865	118	773	597	892	794

113. Subtracting Dollars and Cents. (WRITTEN WORK.) In doing the work below, be sure that you remember:

(*a*) **To use the dollar sign ($)**
(*b*) **To use the cents' point (.)**
(*c*) **To put the cents' points in a straight line**
(*d*) **That 69 cents may be written $.69**
(*e*) **That 8 cents may be written $.08**

Find the answers:

1. Subtract $6.46 from $7.23.

2. Take $4.65 from $9.25.

3. $5.10 − $2.30 = ?

4. Find the difference of $1.49 and $9.52.

5. Take two dollars and forty-three cents from three dollars and three cents.

6. How much must be added to $3.90 to make $5.09?

7. What is the difference of $8.50 and $9.10?

8. $3.17 and ..... = $4.20.

9. If you take $1.09 from $2.11, how much is left?

10. How much more is seven dollars than six dollars and sixty-two cents?

11. The difference of $8.01 and $7.92 is how much?

12. How much is left when you subtract $4.98 from $6.01?

114. Subtraction Problems. (WRITTEN WORK.) Read each of these problems carefully before you work it. Think what you are asked to find.

1. Clara has 4 dimes and 3 pennies in her bank. How much less money has she than Agnes, who has 6 dimes and 9 pennies?

2. Harry's new suit cost $6.75. How much more did Tom's suit cost, if he paid $9.25 for it?

3. Harry's mother said, "Bring me 17 ears of corn from the garden for dinner." Harry made 2 trips and brought in the 17 ears. He brought 9 ears the first time. How many did he bring the second time?

4. Mrs. Woods baked 36 cookies one morning. How many were left if 9 of the cookies were eaten?

5. Clara had a summer dress which cost 37¢ a yard. Her winter dress cost 95¢ a yard. What is the difference per yard in the prices of the cloth for her dresses?

6. Twelve boys were hiding in a "hide-and-seek" game. Eight boys had been caught or had come in free. How many boys were still hiding?

7. Fred rode his bicycle 472 miles. Tom rode his bicycle 428 miles. Fred said that he had ridden 44 miles more than Tom. Was he right?

115. Addition and Subtraction Problems. (WRITTEN WORK.) Some of the problems on pages 151 and 152 are addition, and some are subtraction. First read each problem carefully. Then think what you are asked to do. If the problem asks you to find how many more, how much more, how many less, or the difference, you must subtract. If you are asked to find how many there are all together, you must add.

Remember: (*a*) Think what each problem asks you to find.
(*b*) Decide what numbers you should use to find the answer.
(*c*) Decide whether you add or subtract to find the answer.
(*d*) Think what a reasonable answer would be.

The third-grade children planned a program. Here are some problems about the things they did:

1. Tom chose 7 children to play "Jack and the Bean Stalk." After he had chosen Fred, Clara, and Robert, how many more did he need?

HINTS: (*a*) What does Problem 1 ask you to find?
(*b*) Will you add or subtract?

2. All the children in the class played "Little Boy Blue." One boy was Boy Blue; a girl was the one who called Boy Blue. 14 children played they were sheep, and 12 children played they were cows. How many children were in the class?

HINTS: (*a*) What does Problem 2 ask you to find?
(*b*) Will you add or subtract?

3. Helen said, "We need 4 children to play 'Three Billy Goats Gruff' and 4 children to play 'Three Bears.' For both stories we need ..... children."

4. Nine children were needed to play the story "The Boy and His Goats," and 4 children were needed for "Brer Rabbit." How many more children did the first story use than the second?

5. Eight children played "Oats, Peas, Beans," and twelve children played "The Farmer in the Dell." How many more children played in the second game than in the first game?

6. How many children played in "The Weaving Game," if 8 boys and 8 girls played in it?

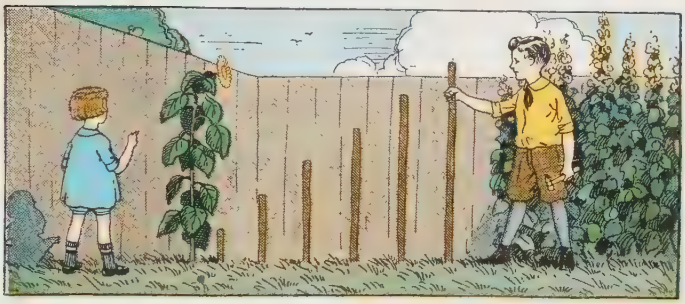
7. Eleven children stood in 2 rows while they sang a song. There were 5 children in the first row. How many children were in the second row?

THE SELF-TESTING DRILLS

116. Running Arithmetic Races. (CLASS WORK.) Do you like to play games and keep scores? If you learn more about a game, your scores are better, aren't they?

Did you ever pitch horse-shoes, or play ring-toss or bean bag? Did you make higher scores after you had played several times? If you did, you were learning more about the games. If you did not, you were not learning very much about the games, were you?

Jack found a little sunflower in his yard. It was just about as high as his knee. He wanted to keep a record to show how much it grew every week. So he drove a stick into the ground beside it one Saturday. Every



Saturday after that for five weeks he drove another stick into the ground to show how high the sunflower was then. The picture above shows how the sticks looked after he had done this for five weeks.

1. How many weeks did Jack keep the record?
2. Did the sunflower grow very fast the first week?
3. In which week did it grow the most?

Would you like to keep a record of your arithmetic work during the remainder of the year? It will be fun to see if you are learning more about arithmetic as you go on through the third grade.

There is a way to keep a record of the scores you make in arithmetic races. About once every week or two from now on you will run a little arithmetic race. These races are called *Self-Testing Drills,* because they give you a chance to test **yourself.**

Look on page 156 and you will see the first Self-Testing Drill. Each drill has 15 examples and problems. You will be given just 15 minutes for each drill. After you finish, your teacher will read the correct answers. You will put a "C" after each correct answer and a

cross (X) after each answer not correct. Then you will count the number of correct answers and look near the bottom of page 157 under the word *Standards* and find your score.

Scores 7 to 10 are **very good.**
Scores 4 to 6 are **fair.**
Scores below 4 are **poor.**

Now look at the Score Card on page 155. This shows the record of Clara Jones. She was a third-grade pupil in the Greenwood School. During her year in the third grade she took 26 Self-Testing Drills and made her record on this Score Card. In the back of this book you will find a Score Card for keeping your record.

Look at the score of Clara Jones on page 155. The scores are printed on the left and the right of the Score Card, and the numbers of the drills at the top and bottom. When Clara took Drill Number 1, she made a score of 1. On Drill Number 2 she made a score of 1.

1. What was Clara's score on Drill Number 3? On Drill Number 4? Drill 5? Drill 6?

2. On Drill 7, did she beat her score on Drill 6?

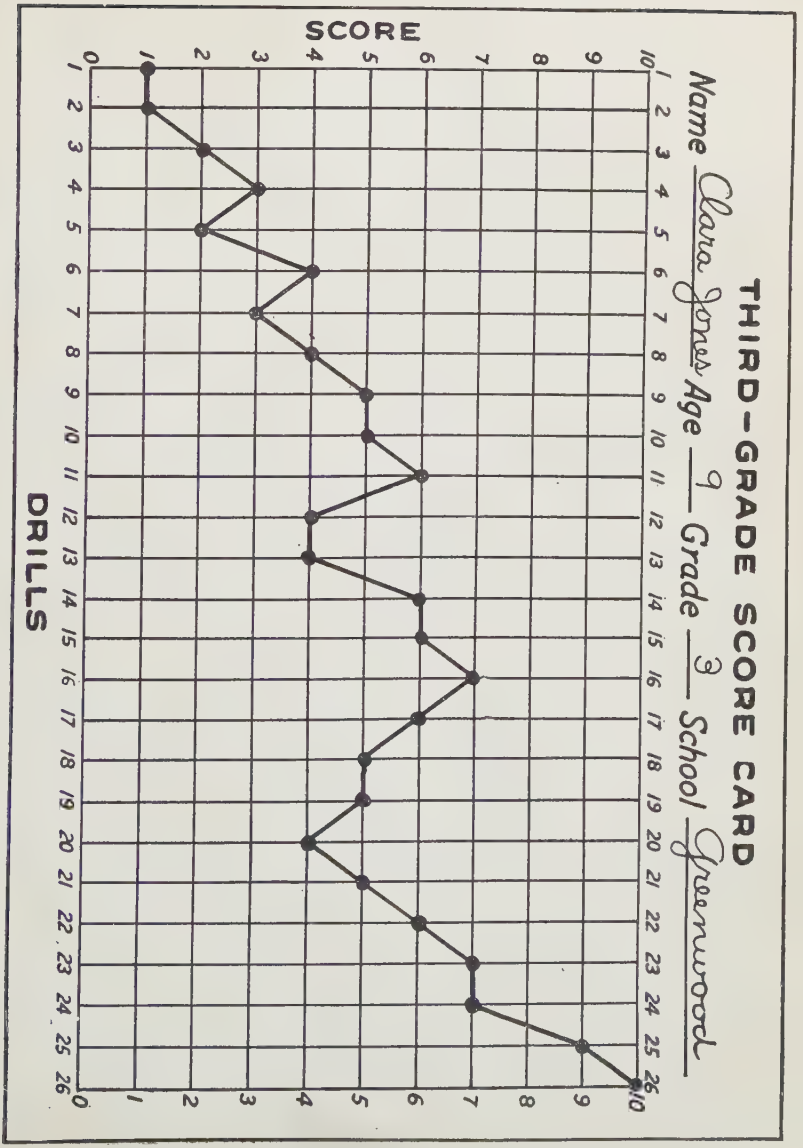
3. Did Clara do well on Drills 16, 17, 18, 19, and 20?

4. How many Drills did she take altogether?

5. What is the best score that can be made on these drills? What is the lowest score that can be made?

6. What is the lowest score that Clara made?

7. Do you think she learned her arithmetic work?


THIRD-GRADE SCORE CARD
Name Clara Jones Age 9 Grade 3 School Greenwood
SCORE
DRILLS

Now get ready to take Drill Number 1. Read the directions. Be sure you understand what to do. Don't start until your teacher says "Go!" After you have finished and have counted the numbers correct, find your score in the Standards, and make a record of it on your Score Card by putting a round dot (.) on the line above Drill 1 and opposite your score. You will do the same with Drill 2. Then you can draw a line between the two dots.

After you have marked your score on the Score Card, go back to your drill and correct any mistakes that you made. If you don't know how, your teacher will help you. Always use the score you made on your first trial.

SELF-TESTING DRILL NO. 1

117. Directions. Wherever possible save copying by placing your paper right below the example. Copy only when necessary.

You will be allowed exactly 15 minutes. Work as fast as you can without making mistakes. Do the examples and problems in order.

Score yourself by the standards at the end of the drill. Wait for your teacher to say "Go!"

1.	2.	3.	4.	5.
Add:	*Add:*	*Add:*	$11+5+6+7=?$	*Add:*
2	68	46		68
6	395	89		17
9		58		5
				94

6. *Add:*

$$\begin{array}{r} 79 \\ 225 \\ 436 \\ 28 \\ \hline \end{array}$$

7. How many tens in 70?

8. $14+7+4+6=?$

9. $16+3+5+6=?$

10. $\begin{array}{r} 15 \\ -9 \\ \hline \end{array}$

11. *Add:*

$$\begin{array}{r} 38 \\ 97 \\ 4 \\ 75 \\ 9 \\ \hline \end{array}$$

12. *Subtract:*

$$\begin{array}{r} 13 \\ 8 \\ \hline \end{array}$$

13. Some children went to the park to find four-leaf clovers. Tom found 22, Clara found 17, and James, 29. How many clovers did all three children find?

14. Clara lost 9 of her four-leaf clovers on the way home. How many did she have left?

15. Write in figures the number that equals 8 tens and 9 ones.

STANDARDS

Number correct.	0	1–5	6	7	8	9	10	11	12	13–14	15
Scores	0	1	2	3	4	5	6	7	8	9	10

If your score does not please you, practice more on this drill.

SUMMARY

118. General Review. (Written Work.) If you can do everything in this article correctly, you will show that you have been studying hard.

1. *Write in figures:*

(*a*) seven dollars and thirty-two cents.

(*b*) four dollars and sixty cents.

(*c*) ten dollars and four cents.

2. Are 2 dimes and 19 cents more than 3 dimes and 7 cents?

3. What is left out of the answer in the example in the box at the right? Write the answer correctly on your paper.

$$\begin{array}{r} \$4.35 \\ 2.40 \\ \hline 1.95 \end{array}$$

4. Subtract seventy-six from one hundred sixty-seven.

5. One answer in the five subtraction examples below is wrong. Find the wrong answer and correct it. Write the five examples and answers on your paper and check each answer. In this way you can find the one with the wrong answer.

(*a*)	(*b*)	(*c*)	(*d*)	(*e*)
863	727	705	803	811
254	359	208	397	423
609	368	497	416	388

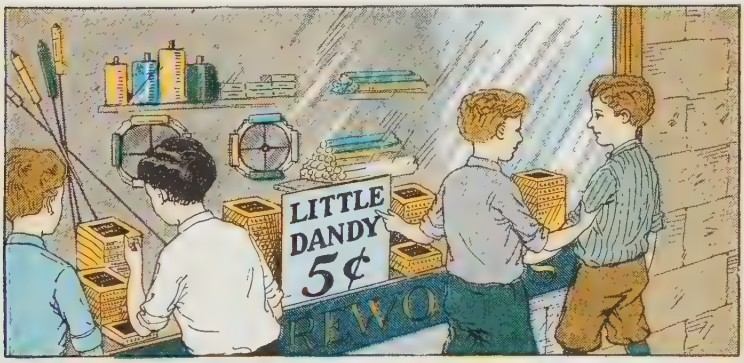
6. Subtract six dollars and nine cents from nine dollars.

7. Is 29 the sum of 23 and 6?

8. How many examples are in Article 104?

CHAPTER VI

FIRST STEPS IN MULTIPLICATION. TWO, THREE, ONE, AND ZERO IN MULTIPLICATION.



119. Two in Multiplication. (CLASS WORK.) You have already learned how to add numbers. In this chapter you will learn a quicker way to add.

1. Lee and James wanted to buy 2 packages of firecrackers that cost 5 cents a package. How much money did they need?

2. How many are 5 and 5?

3. How many are two 5's?

4. Paul had 2 letters to mail. How much money did he need in order to put a 2-cent stamp on each letter?

5. How many are 2 and 2, or two 2's?

6. Clara's mother gave her three cookies for herself and three for June. How many cookies in all did Clara's mother give her?

7. How many are 3 and 3, or two 3's?

Give the answers to the addition examples below.

1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9

8. How many are 4 and 4, or two 4's?

9. Two 6's are how many?

10.	11.	12.	13.
Two 1's = ...	Two 7's = ...	Two 8's = ...	Two 9's = ...

Learn to give all of these answers quickly:

(*A*)

2 5's are.....	2 3's are.....	2 6's are.....	2 1's are.....

(*B*)

2 4's are.....	2 7's are.....	2 9's are.....

(*C*)

2 2's are.....	2 8's are.....

120. The Meaning of "Times." (CLASS WORK.) You know that the sign for plus is +, and that the minus sign is a little line like this, −. You will now learn how to use another word and sign.

1. A girl took 5 cents out of her bank one Saturday morning and bought candy with it. That afternoon she took 5 cents more from the bank to pay for an ice cream cone. How many times did she take 5 cents out of her bank that day?

2. Two **times** 5 cents is how many cents?

Read carefully:

5+5 is 10 } These may be written { 2 **times** 5 is 10
Two 5's are 10 } { 2 × 5 is 10

"2×5 is 10" is read, "2 **times** 5 is 10."
× means **times**.

Read the following examples and give the answers. Try these several times until you can give each answer as quickly as you can say 1 and 1 are 2.

3. 2×1=	6. 2×2=	9. 2×7=
4. 2×4=	7. 2×5=	10. 2×6=
5. 2×3=	8. 2×8=	11. 2×9=

When you say "2×4=8," you are **multiplying** 4 by 2. The sign × means to **multiply**. It is called the **multiplication** sign or the **times** sign. Make it carefully, or it will look like the addition sign.

Look at these three signs:	A.	S.	M.
	+	−	×

12. What letter is above the plus sign? What word does this letter stand for?

13. What letter is above the minus sign? What word does this letter stand for?

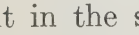
14. What do you think M above the × stands for?

121. Practice in the Use of Signs. (ORAL AND WRITTEN WORK.) In this exercise put the right signs where the dots are. It is not fair to mark in your book.

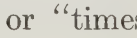
Before you write the examples on your paper and put in the **signs,** practice saying "plus" or "times" for the blank in each example.

EXERCISE

1. 2....5 = 7	**6.** 2....7 = 9	**11.** 2....9 = 18
2. 2....6 = 12	**7.** 2....4 = 6	**12.** 2....4 = 8
3. 2....7 = 14	**8.** 2....2 = 4	**13.** 2....3 = 6
4. 2....5 = 10	**9.** 2....3 = 5	**14.** 2....8 = 16
5. 2....6 = 8	**10.** 2....8 = 10	**15.** 2....9 = 11



SELF-TESTING DRILL NO. 2



122. Directions. Wait until the signal "Go!" is given. Wherever possible save copying by placing your paper right below the example. Copy only when necessary.

You will be allowed exactly 15 minutes. Work as

fast as you can without making mistakes. Do the examples and problems in order.

Try to make a higher score than you did on Drill 1. Score yourself by the standards at the end of the drill.

1. 13
74
73

2. *Add:*
28
617
9

3. The sum of 5 and 7 = ?

4. 19+4+0+5=?

5. *Subtract:*
102
33

6. A girl had 13 cents and spent 5 cents for candy. How many cents did she have then?

7. A boy had 46 marbles, and his uncle gave him 15 more. How many marbles did he then have?

8. 24+5+4+1+7=?

9. 85
8
378
159

10. 7
62
47
76

11. *Subtract:*
146
50

12. Write in a column and add: 5, 73, 63, 56.

13. 8+?=14

14. 136−77=?

15. *Write in figures:* seven hundred eight.

STANDARDS

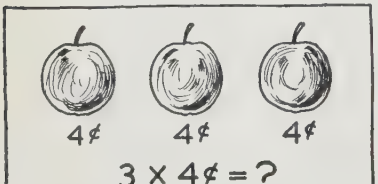
Number correct	0	1–4	5–7	8	9	10	11	12	13	14	15
Scores	0	1	2	3	4	5	6	7	8	9	10

If your score this time is not better than your score on Test Number 1, practice on this drill until you can work every problem and example in 15 minutes or less.

123. Three in Multiplication. (CLASS WORK.) Give the answers that belong where the question marks (?) are.

Add:

1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9
?	?	?	?	?	?	?	?	?



1. Jane bought 3 apples and paid 4 cents for each one. How many cents did she pay for the 3 apples?

One way to get the answer to Problem 1 is to add 4¢ and 4¢ and 4¢, like this: ➳

4¢
4¢
4¢

➳But if you know how many three 4's are, or what 3×4 equals, you won't need to waste time adding.

2. Three 4's are how many?

3. What did Jane pay for the apples?

4	• • • •
4	• • • •
4	• • • •

A HINT TO GOOD WORKERS

You don't want to take time to **add** to get answers to examples like those just above Problem 1, do you? Of course you don't. That was all right in the second

grade, but you are too old for that now, and besides, you have so much to do here in the third grade that you just don't have any time to waste.

You see, in second grade you said to yourself, "If tops cost 8 cents each, and I want 3 of them, they will cost me 8 cents and 8 cents equals 16¢, and 8 cents more equals 24 cents." Now you must learn that three 8's are 24 or that $3 \times 8 = 24$, so that you will **know** it. Then you won't have to stop and **add, add, add.** You will just say it quickly, "Three 8's are 24. Answer is 24 cents." Isn't that the way to do it?

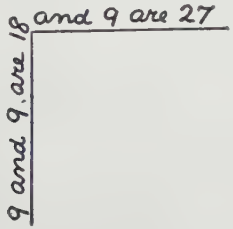
You know how you like to take short-cuts when you are out on a long hike and want to hurry home. Well, there are short-cuts in arithmetic, too.

Multiplication is a short way of adding.

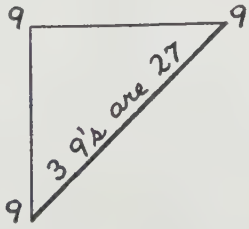
This is the way to make an arithmetic short-cut:

THE THREE NINES

The Long Way Around



The Short-Cut to Answer



Are you ready for the short-cuts with the threes? All right; you will find them on the next page. Study

them hard so that you can give them very quickly. If you don't know the answers, look at the addition columns on page 164, but keep at it until you do not need any such help.

Short-cuts for the Threes

(*A*)

3 6's are.....	3 5's are.....	3 2's are.....	3 1's are.....

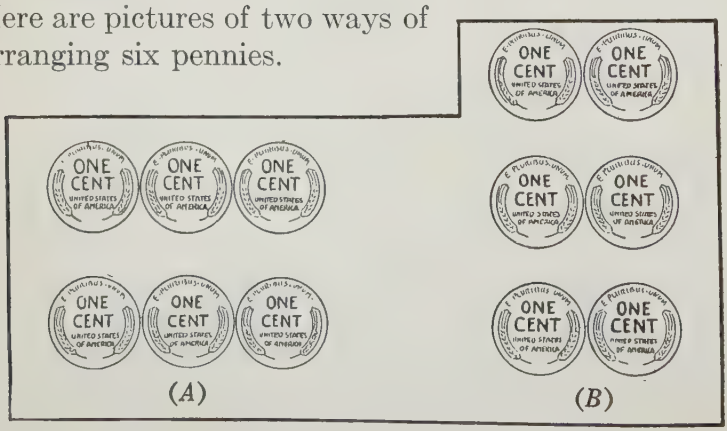
(*B*)

3 7's are.....	3 9's are.....	3 8's are.....

(*C*)

3 4's are.....	3 3's are.....

124. Equal Multiplication Facts. (CLASS WORK.) Did you ever take pennies or other objects and try to arrange them in different ways on the table? It is fun to see how many arrangements you can make with six or eight pennies. Here are pictures of two ways of arranging six pennies.



1. Which picture shows the pennies as two 3's?

2. Which picture shows three 2's?

3. Is there any difference in the number of pennies in the two pictures, even though they are arranged differently?

4. Is this true? Two 3's = three 2's

5. Is this true? $2\times3=3\times2$

6. Is this true? $3\times4=4\times3$

You have already learned 18 multiplication facts, or short-cuts. But in learning these 18 you also learned 14 others. The 18 are in the columns marked (*A*) below. Read each example in (*A*), giving the answer, and wherever there are dotted lines in column (*B*), tell the other way of saying each one. The first should be said like this: "2 times 1 equals 2. 1 times 2 equals 2."

(*A*)	(*B*)		(*A*)	(*B*)	
1. $2\times1=$	1×2	1.	10. $3\times4=$	.....	8.
2. $2\times2=$			11. $3\times2=$		
3. $2\times5=$	.....	2.	12. $3\times3=$		
4. $2\times4=$	.....	3.	13. $3\times1=$	.....	9.
5. $2\times3=$			14. $3\times6=$	.....	10.
6. $2\times6=$	.....	4.	15. $3\times5=$	.....	11.
7. $2\times9=$	.....	5.	16. $3\times9=$	.....	12.
8. $2\times8=$	.....	6.	17. $3\times8=$	.....	13.
9. $2\times7=$	.....	7.	18. $3\times7=$	.....	14.

SELF-TESTING DRILL NO. 3

125. Directions. Wait until the signal "Go!" is given. Wherever possible save copying by placing your paper right below the example.

You will be allowed exactly 15 minutes. Work as fast as you can without making mistakes. Do the examples and problems in order.

Try to beat your past records. Score yourself by the standards at the end of the drill.

1. *Add:*
164
174

2. *Add:*
158
168

3. 89
−24

4. *Add:*
162
54
545

5. *Subtract:*
410
26

6. 931
−265

7. 8 plus 7 plus 9 = ?

8. 14 − ? = 6

9. 50
341
143
363

10. 3
58
20
100

11. A man drove his car 254 miles one day and 157 miles the next. How far did he drive in the two days?

12. 7 plus ? = 16.

13. Subtract 98 from 332.

14. 280 equals.....hundreds.....tens.....ones.

15. How many tens and ones in 82?

STANDARDS

Number correct..	0	1–4	5–6	7	8	9	10	11	12	13–14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

126. Finding What Numbers Are Missing. (ORAL WORK.) One number has been left out of each of the rows below. Tell what number is left out. Read across the rows. In the first row the number 12 is left out. In this row you should count by 2's.

EXERCISE (*A*)

1.	2	4	6	8	10	14	16	18
2.	2	4	6	10	12	14	16	18
3.	3	6	9	12	18	21	24	27
4.	3	6	9	12	15	18	24	27
5.	2	4	8	10	12	14	16	18
6.	3	6	9	15	18	21	24	27
7.	3	6	9	12	15	21	24	27
8.	2	4	6	8	12	14	16	18
9.	2	4	6	8	10	12	16	18
10.	3	6	9	12	15	18	21	27

EXERCISE (*B*)

Give the answers to the examples below. Watch the signs.

1.	**2.**	**3.**	**4.**
$4\times2=$	$3+9=$	$3+5=$	$9\times2=$
$6-2=$	$7-3=$	$3\times5=$	$9+2=$
$7+9=$	$7+3=$	$8-1=$	$9-2=$
$3\times6=$	$3\times9=$	$8-0=$	$9+0=$

PROBLEM ANALYSIS

127. Problem-Solving. (Silent Reading.) In this lesson you will find only parts of problems. The numbers are not given. Read each sentence carefully and get ready to tell whether you would add or subtract to get the answer. Number your paper from 1 to 8, and as you read the parts of problems, write after each number either "add" or "subtract."

1. How much more money did John have than Joe?

2. How many apples did Bob and Billy have together?

3. How much taller is Fred than Tom?

4. How much money did Nell spend for both dolls?

5. How much more money will Bessie need before she can buy the Christmas present for her mother?

6. How many miles did they drive in the three days?

7. How much farther did they drive the first day than the second?

8. How many pounds must Ned gain before he weighs as much as he should weigh?

(Written Work.) After you have told how you would work these problems, finish each problem by putting in numbers and finding the answers. The first one may be finished and written in this way:

John had 38 cents and Joe had 25 cents. How much more money did John have than Joe? *Answer:* 13 cents.

128. Problems. (Oral Reading Lesson.) Read each problem to the class and then give the answer or do what the problem tells you to do.

1. Mary and Chester decided that an easy way to learn to multiply was to count by 2's and 3's. So whenever they played "Hide and Seek," the one who was "It" counted by these numbers instead of counting by 1's.

Mary was just learning the 2's; so she counted by 2's from 2 to 18. She counted by 2's five times when she was "It." Chester counted by 3's from 3 to 27.

Write on the blackboard the numbers Mary counted. Write the numbers that Chester counted.

2. The next time the children played "Hide and Seek," they decided to count backward by 2's and 3's. Play you are "It" and count in this way, beginning with 30.

3. Dick put paper on one side of a stage he built. It took nine thumb tacks for one side. He asked Russell to bring him enough tacks for the other side, which was just like the one he had finished.

The teacher asked Dick how many thumb tacks he would use altogether. What should Dick have said? What was the quick way for Dick to know the number it took for the two equal sides?

4. In decorating their house, Frank and Helen put three Christmas bells on each of eight doors. How many bells did they hang?

The playground teacher divided some children into groups to play games at recess. One day she had:

(*a*) Two lines of children with eight in each line playing overhead relay.

(*b*) Two baseball teams with nine boys on a side.

(*c*) Two indoor ball teams with seven on each side.

(*d*) Five teeter-totters with two children on each one.

(*e*) Three swings with two children on each swing.

(*f*) Four groups playing marbles with three boys in each group.

5. How many children were playing overhead relay?

6. How many children were playing baseball?

7. How many children were playing indoor ball?

8. How many children were on the teeter-totters?

9. How many children were in the swings?

10. How many children were playing marbles?

11. How many children in all were playing games at recess that day?

12. In one corner of the playground there were a number of children in a group. Fifteen of them were giving a folk-dance and thirteen were watching. How many children were in this group?

13. How many children in all were playing the games, folk-dancing, and watching the dancing?

129. Practice with 2 and 3 in Multiplication. (ORAL WORK.) Give the numbers that belong on the blanks in the four columns below.

EXERCISE

	(*A*)	(*B*)	(*C*)	(*D*)
1.	2×.. is 2	2×.. is 10	2×.. is 6	8×.. is 24
2.	2×.. is 8	3×.. is 27	7×.. is 14	3×.. is 15
3.	3×.. is 6	6×.. is 12	2×.. is 18	..×2 is 16
4.	5×.. is 10	3×.. is 9	3×.. is 21	..×7 is 14
5.	8×.. is 16	3×.. is 12	2×.. is 12	..×2 is 12
6.	2×.. is 4	6×.. is 18	3×.. is 3	..×4 is 12
7.	1×.. is 3	2×.. is 16	7×.. is 21	..×2 is 18
8.	2×.. is 14	9×.. is 18	3×.. is 18	..×4 is 8
9.	3×.. is 24	5×.. is 15	9×.. is 27	..×5 is 10
10.	1×.. is 2	4×.. is 8	4×.. is 12	..×2 is 2

☞ You should practice these examples until you can give the numbers that belong on the blanks in three minutes or less.

130. One in Multiplication. (Class Work.) It is easy to multiply a number by 1 or to multiply 1 by a number. If apples are 5 cents each, 1 apple will cost 5 cents. 1×5 is 5. If you pay 1 cent for a stamp, 5 stamps will cost 5 cents. 5×1 is 5. Remember that 1 times any number is that number.

Look at the examples below. Read down the columns and give the answers.

EXERCISE

1.	2.	3.
$1 \times 4 = 4$	$1 \times 2 = 2$	$1 \times 1 = 1$
$4 \times 1 = 4$	$2 \times 1 = 2$	$1 \times 6 = 6$
$1 \times 15 = 15$	$20 \times 1 = 20$	$26 \times 1 = 26$
$15 \times 1 =$	$1 \times 20 =$	$1 \times 26 =$
$1 \times 7 =$	$8 \times 1 =$	$1 \times 9 =$
$6 \times 1 =$	$1 \times 11 =$	$30 \times 1 =$
$1 \times 10 =$	$23 \times 1 =$	$1 \times 62 =$
$13 \times 1 =$	$1 \times 24 =$	$91 \times 1 =$

Look carefully at the examples below. Watch the signs and give the answers.

4.	5.	6.	7.
$5 \times 1 =$	$1 \times 1 =$	$7 + 1 =$	$3 + 3 =$
$1 \times 3 =$	$4 - 4 =$	$2 + 2 =$	$3 - 3 =$
$4 - 1 =$	$5 + 1 =$	$9 \times 1 =$	$3 \times 3 =$
$1 + 1 =$	$7 \times 1 =$	$9 - 1 =$	$4 + 3 =$
$1 + 3 =$	$1 + 6 =$	$9 + 1 =$	$4 - 3 =$

131. Rapid Drill. (CLASS WORK.) The practice in the boxes below will make your arithmetic work easier for you.

Spend ten minutes thinking out the answers to the examples. Be ready to give the answers quickly when your teacher calls on you.

	(*A*)	(*B*)	(*C*)	(*D*)	(*E*)	(*F*)
1.	7+4+8	7×3	9+8+5	6×2	13−6	15 −8
2.	15−9	2×9	12 −7	7+2+7	3×9	14−7
3.	14 −9	8×3	19+6	37+9	7×2	3 +78
4.	26+8	1×10	13−7	8+6+9	13−9	25+9
5.	6×3	14−5	5+8+9	8×2	17 +67	68 −52
6.	8+9+9	13−5	3×8	9+6+9	17−8	28+6
7.	75 −48	7+6+8	84 −25	58 +27	83 −68	9×3

132. Zero in Multiplication. (Silent Reading.) You know that $3+3+3+3$ is the same as four 3's, or $4\times3=12$. You have also learned that $0+0=0$. No matter how many times you add zero to zero, the answer is zero.

Example (A)
$0+0+0+0+0=0$
Five 0's $=0$
$5\times0=0$

Look at Example (*A*). If you add zero 5 times, you get the answer zero.

$5\times0=0$. Any number times 0 is 0.

If you put your hand into a box twice and get 2 apples each time, how many apples would you have? But if you put your hand into a box twice and do not get any apples either time, you would have no apples, or zero apples. $2\times0=0$. Tell which of these examples are not correct.

1. $5\times0=0$	6. $0\times3=0$	11. $2\times0=2$
2. $0\times5=0$	7. $1\times0=0$	12. $8\times0=0$
3. $4\times0=4$	8. $0\times0=0$	13. $0\times7=0$
4. $3\times0=0$	9. $9\times0=9$	14. $0\times9=0$
5. $15\times0=0$	10. $0\times32=0$	15. $45\times0=0$

Zero times any number or any number times zero is zero.

In the examples below, watch the signs carefully.

1. $4+0=$	4. $0+9=$	7. $6\times0=$	10. $0\times8=$
2. $4\times0=$	5. $6-0=$	8. $8\times0=$	11. $8-0=$
3. $9\times0=$	6. $6+0=$	9. $0+8=$	12. $15+0=$

SELF-TESTING DRILL NO. 4

133. Directions. Wait until the signal "Go!" is given. Wherever possible save copying by placing your paper right below the example.

Time allowed: 15 minutes. Work as fast as you can without mistakes. Do the examples in order.

Try to beat all your past records. Score yourself by the standards at the end of the drill.

1.
2
10
21
42
13

2.
22
3
30
32
12

3.
90
−75

4. 9+9+0+8=?

5.
14
−?
9

6. How many hundreds are in 600?

7. *Add:* 57, 85, and 38.

8. *Write in figures:* Two hundred nineteen.

9. What is the sum of thirteen, four, and two?

10. *Write in figures the number that equals:* 7 hundreds, 3 tens, and 2 ones.

11. 137 minus 8=?

12. 243 equals ..... hundreds ..... tens ..... ones.

13. The difference of 386 and 89=?

14. Fifty-eight minus twenty-nine equals how many?

15. Two hundreds plus four tens plus five ones=?

STANDARDS

Number correct..	0	1–3	4	5	6–7	8	9	10	11	12–14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

134. Column Form of Multiplication. (ORAL WORK.) You know that addition and subtraction examples may be written in different forms. When one figure is written above another, they are in a **column.** You learned to write addition and subtraction examples in columns long ago.

Multiplication examples may also be written in columns. 2×3 in a column looks like this:

Multiply:	3
	2
	6

It is read: "two 3's are 6" or "2 **times** 3 is 6."

Read the examples below, giving the answers as you read. In Example 1, say "four 3's are 12."

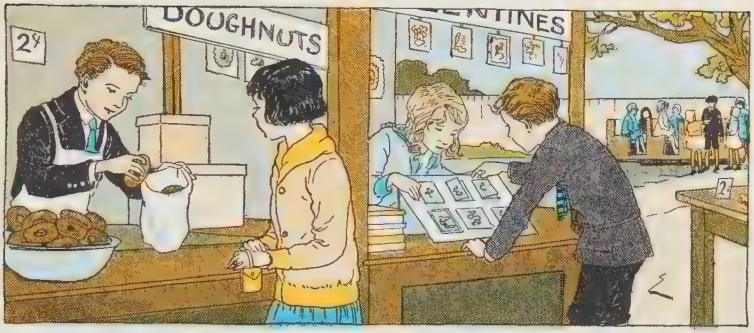
EXERCISE

Multiply:

1.	2.	3.	4.	5.	6.	7.	8.
3	2	7	3	1	0	9	6
4	8	2	6	7	5	3	2

9.	10.	11.	12.	13.	14.	15.	16.
3	2	3	8	6	2	3	3
5	7	9	1	3	5	8	7

17.	18.	19.	20.	21.	22.	23.	24.
8	9	4	2	8	7	2	2
3	2	3	6	2	3	4	9



135. Problems. (Oral Reading Lesson.) Read these problems to the class and give the answers. Read carefully to be sure that you know what you are trying to find.

1. Barton School had a fair one afternoon. It cost 3¢ to ride on the merry-go-round. Hazel's brother gave seven of the girls a ride.

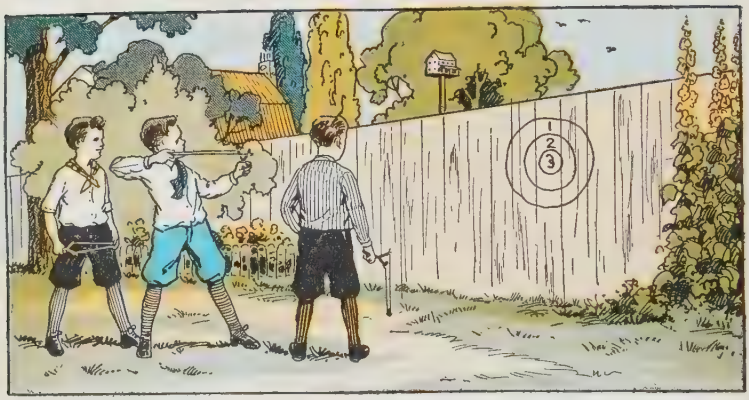
(*a*) How much did he pay all together for the girls' rides?

(*b*) What change should he have received from a quarter?

2. Bob sold doughnuts at 2¢ each. Clara bought six. How much did she pay for them?

3. Morton bought eight valentines at 3¢ each. How much did they cost?

4. At the fair the children had a table on which they placed different things, each to be sold for 2¢. They sold nine things that afternoon. How much money did this sale bring them?



136. Shooting at a Target. (WRITTEN WORK.) This article will tell you how some boys kept their records of target shooting. Write the numbers 1 to 5 on your paper and give the answers to the questions.

Leo, John, and Cal made a target to put up on John's fence so that they could shoot at it with their slingshots. Each circle counted a certain number of points. To hit in the smallest circle counted 3 points. The next larger circle counted 2 points, and the largest counted only 1 point. To miss the target counted zero.

Each boy kept a record of his shots. When he hit in a circle, he put a mark after the right number and under his name. The records are shown here.

Points	***Leo***	*Points*	***John***	*Points*	***Cal***
3	////	3	////	3	////
2	////	2	////	2	////
1	////	1	////	1	////
0	////	0	////	0	////

1. Who hit inside circle 3 the most times?
2. Which boys hit inside circle 2 the most times?
3. Who hit inside circle 1 the most times?
4. Who had the highest score?
5. Who had the lowest score?

137. Practice in Watching Signs. (ORAL WORK.) Sometimes examples in addition, subtraction, and multiplication are printed in the same exercise. If you don't watch the signs carefully, you will make mistakes.

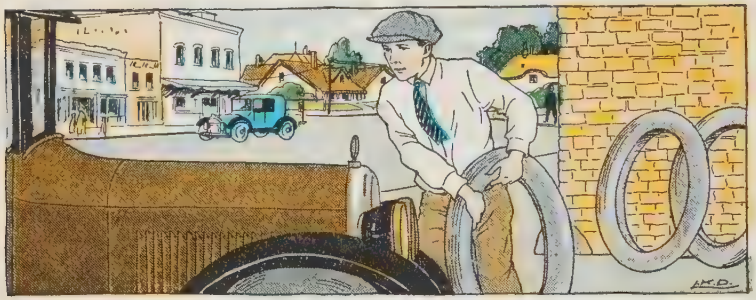
Give the answers to the examples in the exercise below. Remember what the signs $+$, $-$, and $\times$ stand for.

EXERCISE

1.	2.	3.	4.	5.	6.	7.	8.
5	5	5	4	0	1	1	8
$+3$	-3	$\times 3$	$\times 0$	$+4$	-1	$\times 1$	$\times 1$

9.	10.	11.	12.	13.	14.	15.	16.
1	2	2	2	8	2	9	3
$+1$	-2	$\times 2$	$+8$	-2	$\times 8$	$+3$	$\times 9$

17.	18.	19.	20.	21.	22.	23.	24.
3	7	3	3	8	6	6	6
$+7$	-3	$\times 7$	$\times 8$	-8	$+3$	$\times 3$	-3



MULTIPLICANDS OF MORE THAN ONE FIGURE

138. Learning to Multiply Two-Figure Numbers. (CLASS WORK.) Mr. Bates had to buy 3 new tires for his automobile. Each tire cost $23. In order to pay for the tires Mr. Bates needed to know how much all three of them would cost. How do you suppose he found out? He might have found the answer by adding, but when he went to school, he had learned some short-cuts.

Look at the examples below. Example (*A*) is worked by adding. Example (*B*) is worked by multiplying.

(*A*) *The Slow Way*	
$23	3+3+3 is 9.
23	
23	2+2+2 is 6.
$69	
Answer: 69 dollars	

(*B*) *The Short-Cut*	
$23	Say 3×3 is 9.
3	Write the 9 under the 3.
$69	Then say 3×2 is 6.
	Write the 6 under the 2.
Answer: 69 dollars	

What does the $69 tell you about the problem?

Isn't it much quicker to write $23 just once and multiply it by 3 than it is to write $23 three times and

then add? Isn't it fun to learn these new short-cuts? You will learn many more this year. Watch for them.

139. Practice in Multiplying Two-Figure Numbers. (ORAL AND WRITTEN WORK.) Give the answers to the examples below. Then copy them and write the answers. Study the samples.

Sample (A)

20	Think:
2	$2\times0=0$
40	$2\times2=4$

Sample (B)

54	Think:
2	$2\times4=8$
108	$2\times5=10$

EXERCISE

Multiply:

1.	2.	3.	4.	5.	6.	7.
21	23	50	25	20	42	43
3	2	2	1	4	2	2
8.	9.	10.	11.	12.	13.	14.
40	13	12	51	41	34	11
2	3	4	2	1	2	3
15.	16.	17.	18.	19.	20.	21.
30	22	33	53	72	90	31
3	3	2	2	3	3	4
22.	23.	24.	25.	26.	27.	28.
30	10	21	30	31	31	21
6	9	8	7	8	5	7

SELF-TESTING DRILL NO. 5

140. Directions. Wait until the signal "Go!" is given. Wherever possible save copying by placing your paper right below the example. Copy only when necessary.

Time allowed: 15 minutes. Work as fast as you can without making mistakes. Do the examples in order.

Try to beat all your past records. Score yourself by the standards at the end of the drill.

1. 21
10
66
13

2. *Add:*
259
136

3. 558
−278

4. *Subtract:*
52
34

5. 537
−172

6. 445
−168

7. 640
−380

8. 238
−159

9. 414
−366

Write in figures:

10. Nine hundred six.

11. Three hundreds, no tens, and no ones.

12. 551
−157

13. 14
−?
5

14. Subtract 107 from 214.

15. 280 minus 273 = ?

STANDARDS

Number correct..	0	1–2	3–4	5–6	7	8–9	10	11	12	13–14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

If subtraction bothered you, practice the examples on pages 370 and 371.

141. Practice in Multiplying Three-Figure Numbers. (ORAL AND WRITTEN WORK.) Tell how to get the answers in Examples (*A*), (*B*), and (*C*) below.

Example (A)

	Think:
121	$3\times1=3$
3	$3\times2=6$
363	$3\times1=3$

Example (B)

	Think:
102	$2\times2=4$
2	$2\times0=0$
204	$2\times1=2$

Example (C)

	Think:
300	$2\times0=0$
2	$2\times0=0$
600	$2\times3=6$

What is the answer in (*A*) above? In (*B*)? In (*C*)?

Do you remember that the answer in addition is the **sum,** and in subtraction the answer is the **difference?**

The answer in multiplication is called the **product.** "Product" is a new word. You should learn how to spell it and what it means.

Give the products for these examples:

1.	2.	3.	4.	5.	6.
111	210	201	124	323	404
3	3	4	2	2	2
7.	**8.**	**9.**	**10.**	**11.**	**12.**
133	202	412	301	246	430
3	2	2	2	1	2
13.	**14.**	**15.**	**16.**	**17.**	**18.**
230	222	303	121	333	400
3	2	2	4	3	2

142. Rapid Drill. (CLASS WORK.) See how quickly you can think out the answers to the examples in the boxes below.

Your teacher will tell you how much time she will let you use. At the end of that time she will say "Stop!" Be ready to give the answers.

	(A)	(B)	(C)	(D)	(E)	(F)
1.	$17-8$	$9+5+8$	9×2	$6+7+7$	$15-7$	$6+5+9$
2.	3×8	$13-4$	$22+7$	0×9	$15+7$	$18+5$
3.	$12-5$	$9+4+6$	1×18	$26+9$	$17-9$	$9+5+9$
4.	$16-7$	$4+6+7$	$14-6$	20×4	$16-9$	$23+25$
5.	$12-3$	$15-8$	$8+4+7$	$15-9$	$57+14$	13×3
6.	11×8	$9+3+8$	$87-19$	$44-16$	50×2	$89-73$
7.	$16-8$	$11-9$	$32-25$	$15-6$	$66-57$	$11-8$

SUMMARY

143. General Review. (WRITTEN WORK.) Write the answers for the problems and examples below.

1. Add six dollars and nine cents to three dollars and ninety cents.

2. Subtract three dollars and twenty-eight cents from seven dollars and two cents. Check your answer.

3. Is 6 the sum or the difference of 4 and 2?

4. *Write in a column and add:* 40 cents, $1.25, 39 cents, and $2.47. Check your answer.

5. In 246 there are ..... hundreds, ... tens, and ..... ones.

6. Does $2+4$ equal 4×2?

7. Write four numbers in a column, add them, and check your answer.

8. Subtract one number from another number and check the answer.

Copy the examples below and put the correct signs or numbers where the dotted lines are.

9. $8 \ldots 2=10$	13. $24 \ldots 16=40$	17. 4 minus $3=\ldots$
10. $8 \ldots 2=16$	14. $38 \ldots 8=30$	18. 3 times $4=\ldots$
11. $8 \ldots 2=6$	15. $14=7 \ldots 2$	19. $203 \ldots 2=406$
12. $9 \ldots 0=0$	16. 3 plus $4=\ldots$	20. $86 \ldots 25=111$

21. In $4\times2=8$, what is the 8 called?

CHAPTER VII

CARRYING IN MULTIPLICATION. FIVE AND FOUR IN MULTIPLICATION. THE CALENDAR

CARRYING IN MULTIPLICATION

144. Getting Ready to Carry in Multiplication. (ORAL PRACTICE.) By this time you can quickly give the sums for addition examples like this, can't you? $2+2+3=?$ You can also give the products for examples like $2\times3=?$

Do you think you can learn to be quick in giving answers to examples which are partly multiplication and partly addition, like this: $2\times2+1=?$ What is the answer?

It wasn't hard to get the answer, was it? If you will learn to give rapidly the answers to the examples in this article, the work on the next few pages will be easy.

EXERCISE

Give the answers:

	(*A*)	(*B*)	(*C*)	(*D*)
1.	$2\times1+1$	$3\times0+1$	$3\times2+1$	$7\times0+1$
2.	$2\times0+1$	$4\times1+1$	$3\times2+2$	$7\times0+2$
3.	$3\times1+1$	$5\times1+1$	$6\times1+1$	$2\times4+1$
4.	$3\times1+2$	$4\times0+1$	$6\times0+1$	$4\times2+1$

	(A)	(B)	(C)	(D)
5.	$3\times3+2$	$5\times0+1$	$7\times3+2$	$8\times1+1$
6.	$2\times2+1$	$2\times3+1$	$7\times1+2$	$8\times0+2$
7.	$8\times1+2$	$9\times0+2$	$6\times2+1$	$8\times3+1$
8.	$8\times0+1$	$2\times5+1$	$2\times7+1$	$3\times6+1$
9.	$3\times3+1$	$3\times4+1$	$3\times5+2$	$3\times9+2$
10.	$9\times1+1$	$5\times2+1$	$7\times2+2$	$6\times3+1$
11.	$3\times8+2$	$3\times4+2$	$3\times5+1$	$2\times9+1$
12.	$9\times1+2$	$4\times3+1$	$7\times2+1$	$3\times7+1$
13.	$9\times0+1$	$2\times6+1$	$5\times3+1$	$8\times2+1$

Give the answers to these examples, adding 2 to each product. The answer to the first one is 18.

Add 2

2	6	2	7	3	0	3
×8	×3	×9	×3	×8	×3	×9

Give the answers to these, adding 1 to each product.

Add 1

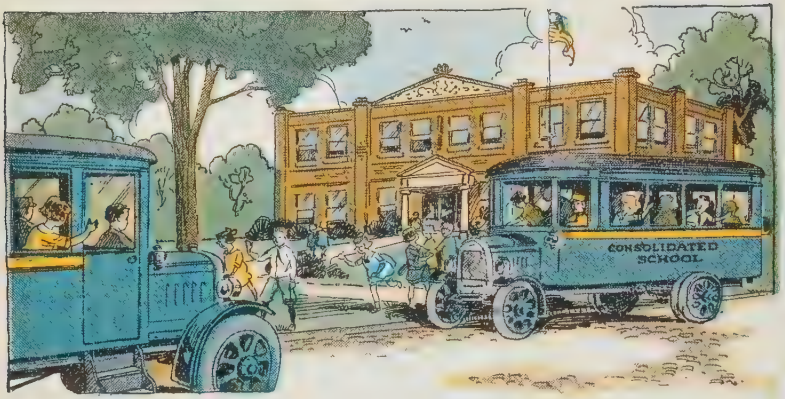
2	3	8	1	9	8	3
×9	×7	×3	×7	×3	×2	×9

Give the numbers that belong on the blanks:

(*a*) $3\times6+\_\_=20$ | (*d*) $3\times\_\_+1=10$ | (*g*) $7\times\_\_+1=22$

(*b*) $3\times0+\_\_=2$ | (*e*) $9\times\_\_+1=19$ | (*h*) $9\times\_\_+2=2$

(*c*) $7\times2+\_\_=16$ | (*f*) $2\times8+\_\_=17$ | (*i*) $9\times\_\_+2=29$



145. How to Carry in Multiplication. (CLASS WORK.) These automobile busses took children to the big school in the country. There were 36 children in each bus. How many children were there in both busses?

You can find out how many children there were in the two busses by adding 36 and 36, can't you? That is what is done under (*A*) at the left below. Look at (*B*), The New Way.

(*A*) *The Old Way*		(*B*) *The New Way*	
Add:	6 and 6 are 12.	*Multiply:*	2×6 is 12.
36	Write 2 and *carry* 1.	36	Write the 2, *carry* 1.
36	1+3 is 4, and 3 are 7.	2	2×3 is 6, and 1 are 7.
72	Write the 7.	72	Write the 7.

Do you like the "new way"? Let's try it again with other numbers. Look at the top of page 191 and you will find another example. What is the answer to 3×47? This is the new way to get it.

(*C*)

Multiply:	
47	3×7 is 21.
3	Write the 1, *carry* 2.
141	3×4 is 12, and 2 are 14.
	Write the 14.

(*D*)

Prove by adding:
47
47
47
141

1. In Example (*B*) what number was carried?
2. In Example (*C*) what number was carried?

In the examples below tell the number to carry. Don't take the time now to find the products. Just tell what number you should carry in each example.

Multiply:

3.	**4.**	**5.**	**6.**	**7.**	**8.**	**9.**
23	39	21	18	26	80	27
4	3	3	3	2	3	3
10.	**11.**	**12.**	**13.**	**14.**	**15.**	**16.**
34	12	89	70	13	57	32
3	4	2	2	4	3	9
17.	**18.**	**19.**	**20.**	**21.**	**22.**	**23.**
23	12	10	23	33	32	31
8	7	9	6	7	5	8

24. Now find the products for the examples above.

SELF-TESTING DRILL NO. 6

146. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. Find your score and make the record on the Score Card. **Try to beat all your past records.**

1. 901	2. 79	3. 641	4. 67	5. 276
−501	504	−404	260	99
	98		9	448
6. 146	4		389	75
−68				

7. Four subtracted from eight equals what number?

8. Mary is eight years old, and her sister is fifteen years old. How many years older than Mary is her sister?

9. Jack had 5 marbles in his hands, 32 in a bag, and 18 in his pockets. How many marbles did he have?

10. 345	11. 611	12. 206	13. *Write in words:* 126	14. 835
−297	−497	−197		−596

15. *Write in figures the larger of these numbers:*

(*a*) Four hundreds, one ten, and no ones.

(*b*) Six hundreds, no tens, and one one.

STANDARDS

Number correct..	0	1–3	4–5	6–7	8	9	10	11	12	13–14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

If subtraction bothered you, study Articles 290 and 291.

147. Saving Time by Being Careful. (SILENT READING.) It always pays to save time if you can. But of course you must do your work well. If you are sure that you know how to multiply, you won't have

to prove your work so much. When you prove some multiplication examples by adding, it takes a long time to write the numbers to be added.

(*A*)
Multiply:
32
9
288

To prove Example (*A*) by adding, it is necessary to write 32 in a column 9 times as shown under (*B*).

If you are careful in your multiplication and almost never make mistakes, you will save a great deal of time.

(*B*)
32
32
32
32
32
32
32
32
32
288

Do you see why the third-grade boy in the picture made the "Safety First" sign?

148. Estimating an Answer. (Class Work.) This lesson will help you decide whether the answers you get to problems are about correct. Read the problems in this lesson, but do not work them.

Below each problem you will find several answers printed. Only **one** of these answers is correct. Tell which one of these answers is the correct one. Tell why you think the answer you select is correct.

Before you try to pick out the correct answers to the problems, give the answers to Examples (*a*) to (*d*). They will help you to pick the correct answers to the problems. Don't use your pencil.

(*a*) $30+30+30=$ (*c*) $185-120=$
(*b*) $55-15=$ (*d*) $\$150-\$120=$

1. The first, second, and third grades in a school are planning a Halloween party. Each child is to have one apple. How many apples will they need for refreshments if there are 26 children in the first grade, 32 in the second, and 28 in the third?

Do you think the correct answer is 45 or 86 or 121?

2. The party lasted from 15 minutes after three until 55 minutes after three. How many minutes did the party last?

Is the correct answer 90 minutes, 30 minutes, or 40 minutes?

3. One Saturday Arthur with his family drove 118 miles in their car. Henry with his family drove 185

miles. How much farther did Henry's family drive than Arthur's family?

Is the correct answer 67 miles, 167 miles, or 97 miles?

4. The Ashford family saved money to buy a radio which cost $148.00. When they had saved $122, how much more money did they need to save for the radio?

Is $26, $12, or $65 the correct answer?

149. Problems about Buying and Selling. (WRITTEN WORK.) The problems below will help you to be careful when you buy things and make change. You should be sure that no mistakes are made.

Four good questions to ask yourself when you work problems are:

(*a*) What am I trying to find?
(*b*) Should I add, subtract, or multiply to get the answer?
(*c*) About what should the answer be?
(*d*) Is my answer pretty close to what I estimated or guessed it should be?

Think of these four questions as you work problems.

1. Ray spent 9 cents for marbles. They were sold 3 for one cent. How many did he get?

2. Frances bought 3 notebooks. If they cost 7 cents apiece, how much did she pay for them?

3. Frances spent three cents for pen points. They were sold two for one cent. How many pen points did she get for three cents?

4. Frances bought a loose-leaf notebook cover and the paper to put into it. The cover cost 30¢, and the paper to fill it cost 7¢. How much did both cost?

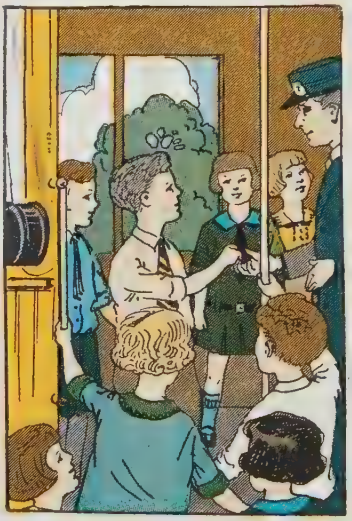
5. Frances had 50 cents when she came to school that day. After buying the three notebooks and the pen points, did she have enough money left to pay for the notebook cover and the paper to fill it?

6. How much more money did she need to pay the teacher for these things?

7. Twenty-two children went on an excursion one afternoon. Their street-car fare was 5¢ each way. The children all gave their car-fare money to Ralph to take care of.

(*a*) How much money did Ralph need to give the conductor each time?

(*b*) How much money did Ralph need altogether for their carfare?



8. One afternoon three children went to see a puppet show. The tickets were 25¢ each. How much did all their tickets cost?

9. Dorothy had a birthday party. She sent invitations to sixteen of her friends. How much did two-cent stamps for the invitations cost?

150. Practice in Carrying in Multiplication—Two-Figure Multiplicands. (WRITTEN WORK.) Find the products in the examples below. If you are not sure that your answers are correct, prove your work by adding.

EXERCISE

Multiply:

1.	2.	3.	4.	5.	6.	7.
18	13	12	36	13	12	78
3	4	5	3	7	6	2

8.	9.	10.	11.	12.	13.	14.
22	13	29	36	37	13	39
4	8	3	2	3	9	2

15.	16.	17.	18.	19.	20.	21.
33	78	47	23	32	23	66
4	3	2	5	7	6	2

22.	23.	24.	25.	26.	27.	28.
32	45	84	57	32	95	23
8	3	3	2	9	2	7

151. Rapid Drill. (CLASS WORK.) Have you noticed that some addition facts are harder to remember than others? It is harder to remember the sum of

8 and 9 than it is to remember the sum of 2 and 2, isn't it? The same thing is true of some of the subtraction and multiplication facts. You must learn to do the hard ones as well as you do the easy ones. If you don't, you will have trouble with arithmetic.

The examples below give you more practice on the hard ones than they do on the easy ones. Your teacher will let you study for a few minutes before she calls for the answers.

	(*A*)	(*B*)	(*C*)	(*D*)	(*E*)	(*F*)
1.	2×8	$5+5+7$	$12-9$	$9+2+8$	7×0	$15-6$
2.	$8+9+7$	$17-8$	5×3	$14-7$	$6+8+9$	$16-8$
3.	3×7	$13-6$	$7+8+6$	$4+36$	1×19	$11-4$
4.	$14+32$	$10-4$	$8+3+7$	$69-18$	$37+62$	$52-16$
5.	$3\times2+2$	$7+9+9$	$4+27$	$11-5$	$60-12$	$16+54$
6.	11×6	$12-8$	$4+8+9$	22×2	$61-32$	$42+49$

THE PROBLEM SCALES

152. Getting Ready for Problem Scale No. 1. (CLASS WORK.) This article will tell you how to do the Problem Scales. Certain lists of problems in this book are called Problem Scales because you can earn points by working correctly the problems in these lists. You can make good scores if you will remember what you have already learned about getting answers to problems.

The first Problem Scale in the book begins on the next page. You will take other Problem Scales every week or two during the year. These "scales" will show you,

(*a*) how well you can work problems;

(*b*) whether you can work problems as well as other pupils in your class;

(*c*) whether you can work problems as well as third-grade boys and girls in other schools.

There are nine problems in the first scale. You will get a certain number of points for working each problem correctly. The number of points you get is printed at the right of each problem.

Answer these questions:

1. Look at Problem 1 on page 201. How many points do you get for working it correctly?

2. How many points do you get for working Problem 4 correctly? Problem 5?

3. Add the points together for the nine problems. How many points can you earn if you work every problem correctly?

Look at the Standards on page 202. Do you see that if a pupil's score is 6 points or less, he is doing very poor (inferior) work?

4. If a pupil gets 10 points, what kind of work is he doing?

5. How many points do you need to get to be a "good" worker?

6. If you get 40 points, what kind of work will you be doing?

After you take the test, the teacher will read the correct answers so that you can see how many of the problems you worked correctly. You should then add the points you have earned and look at the Standards to see what kind of work you did.

After you have found your score, if you think your work is not as well done as it should be, read Article 69 on page 86 and Article 70 on page 88 again.

PROBLEM SCALE NO. 1

153. A Test in Working Problems. (WRITTEN WORK.) If you work every problem correctly, you will earn 50 points.

In a second-grade class of Grant School, there were 3 girls and 2 boys who did much better work than the other

pupils. The teacher wondered if they could do third-grade work, and so she gave them a test to find out.

This is the arithmetic test she gave them. Work the problems and see if you think the test is easy.

1. Some decorations were needed for a school Christmas tree. Jane brought 4 decorations, Betty brought 5, Tom brought 9, and Mildred brought 24. How many decorations were brought in all by the four children? (4)

2. There were 25 children in the third grade of Grant School one September. Five other children entered that grade during October. How many were in the class then? (4)

3. In the third-grade room of Grant School there were five rows of seats, with eight seats in each row. How many seats were there in this room? (4)

4. How many of the seats were not needed for the third grade in Grant School? (See Problem 2.) (5)

5. Jack had no marbles of his own, and so Tom, his older brother, gave him some of his. Tom gave Jack one hundred "commies," thirty "shooters," and six "canicks." Write in figures the number of marbles Jack then had all together. (6)

6. Ruth wanted to buy a birthday present. She earned 8 cents by going on an errand for her mother and 7 cents by taking care of the baby for the next-door neighbor. How much money did she earn in these two ways? (6)

7. Three boys helped their teacher count the books in their room. There were two hundred eighty books in all. Sixty-seven of them were geographies. How many other books were there? (6)

HARDER PROBLEMS FOR GOOD WORKERS

8. Sam had saved 90 cents. He bought a bicycle horn for 60 cents. How much money did he have left? (7)

9. Mr. Young told some children he would pay one cent for every bunch of dandelion roots dug from his yard. There were to be 10 dandelion roots in each bunch. One morning Harry dug 90 dandelion roots from Mr. Young's yard. How much money did Harry earn? (8)

STANDARDS

Superior work:	26–50 points	Slow work:	7–13 points
Good work:	20–25 points	Inferior work:	0– 6 points
Average work:	14–19 points		

SELF-TESTING DRILL NO. 7

154. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. Find your score and make the record on the Score Card. **Try to beat all your past records.**

1. 34 ×2	2. 41 ×2	3. 9×2=?	4. 32 ×4	5. 200 ×2
6. 101 ×3	7. 20 ×3	8. ?×3=27	9. 56 73 97 85	10. 811 −453

11. 2 times what number equals 16?

12.
67
6
659
75

13. In each of 3 schoolrooms there are 40 desks. How many desks are there in the three rooms?

14. How many tens and ones are in 34?

15. One farmer raised 649 chickens in 1926 and another farmer raised 276 the same year. How many chickens did both farmers raise in the year?

STANDARDS

Number correct	0	1–6	7	8	9	10	11	12	13	14	15
Scores	0	1	2	3	4	5	6	7	8	9	10

If addition bothered you, study Articles 288 and 289.

HARDER CARRYING IN MULTIPLICATION

155. Further Study of Harder Carrying in Multiplication. (CLASS WORK.) Do you remember the "tricks" in addition that you learned to do? It was fun, wasn't it? There are some interesting tricks in carrying in multiplication, too. There isn't anything really new about them, but unless you learn to do them they will sometimes "catch" you. Every third-grade pupil likes to learn tricks. Here they are:

FIRST TRICK

Answer the questions asked about Example (*A*).

Multiply:

(*A*)
$$\begin{array}{r} 147 \\ \times\ \ 2 \\ \hline 294 \end{array}$$

(*a*) Why was the figure 4 written in the answer?

(*b*) If 2×4 is 8, why is the next figure in the answer 9? Do you see that when you multiplied 7 by 2 the product was 14; so you had to write 4 and carry 1? Then you said, "two 4's are 8 and 1 are 9." You wrote the 9. You carried from the **ones'** column where the 7 is, didn't you?

Put a piece of paper under the six multiplication examples below, and just write the answers. Your teacher will tell you the correct answers in a few minutes. Put a cross over any of your answers that are wrong. Don't be too slow.

1.	2.	3.	4.	5.	6.
124	225	219	214	113	113
3	2	3	2	5	6

SECOND TRICK

In the first trick you carried a number from the ones' column. See what happens in the second trick.

Multiply:

(*B*)

$$\begin{array}{r} 172 \\ \times\ \ 3 \\ \hline 516 \end{array}$$

(*a*) Why was the 6 written in the ones' place in the product?

(*b*) After writing the 6 did you carry anything to the next place?

(*c*) Why was 1 written in the tens' column in the product?

(*d*) Explain how the figure 5 got into the product.

(*e*) From which place did you carry in this example?

☛ Do you see that you sometimes have to carry from the ones' column and sometimes from the tens' column?

Fold the edge of your paper under and write the answers to Examples 1 to 6.

1.	2.	3.	4.	5.	6.
132	273	293	181	170	132
4	2	3	3	3	3

In addition columns you will remember that you sometimes have to carry more than once. You also know that you may have to carry different numbers in the same example. The same thing happens in multiplication.

Study the third trick, on the next page, and see if you can answer the questions.

THIRD TRICK

Multiply:

(*C*) 249 × 3 = 747

(*a*) Why is there a 7 in the ones' place in the product?

(*b*) What number was carried from 3×9?

(*c*) How did the figure 4 get into the tens' column of the product?

(*d*) What number was carried after the 4 was written in the answer?

(*e*) How many times were numbers carried in working this example?

(*f*) What numbers were carried?

☛ Do you see that you sometimes carry from **both** the ones' column and the tens' column?

Get your paper ready for the examples below. Be careful. Carry only when you need to.

1.	2.	3.	4.	5.	6.
132 × 7	123 × 6	112 × 5	169 × 2	232 × 3	123 × 5

FOURTH TRICK

Do **zeros** in examples ever bother you? Even though a zero by itself isn't worth anything, it is pretty important when written with other figures, isn't it? The zero in 10 is a very important figure, for if you take it away you leave only 1. Example (*D*) has a zero that you need to watch.

Multiply:

(*D*) 107 × 2 = 214

(*a*) Why is the 4 in the product?

(*b*) Explain why the 1 is in the product.

Tell what the products are in the examples below.

1.	2.	3.	4.	5.	6.
204	103	303	107	209	103
3	8	3	3	2	6

FIFTH TRICK

In this trick the **zero** comes in the answer.

Multiply:
(*E*) 136
3
408

(*a*) Tell why the 8 is in the product.
(*b*) What is the answer to $3 \times 3 + 1$?
(*c*) Tell why the zero is in the product.

Work the next six multiplication examples on your paper quickly.

1.	2.	3.	4.	5.	6.
234	136	232	121	133	35
3	3	3	5	3	3

SIXTH TRICK

This trick is with dollars and cents. Remember that the little point between dollars and cents is the **cents' point.** Don't forget to put it in.

Multiply:
(*F*) \$1.36
2
\$2.72

(*a*) Read the answer.
(*b*) How many figures should be at the right of the cents' point?

Put your paper under Examples 1 to 5 and find the products. Be quick, but do neat work.

1.	2.	3.	4.	5.
\$1.42	\$2.06	\$4.00	\$1.83	\$4.06
3	3	2	3	2

Study Example 6. Then when your teacher tells you to start, write the answers for Examples 7 to 9.

Multiply:

6. \$.59 × 2 = \$1.18

2 times 59 cents. The answer is one dollar eighteen cents. Remember where the point belongs.

7.	8.	9.
\$.68 × 3	\$.80 × 2	\$.75 × 2

156. Practice in Harder Carrying in Multiplication. (WRITTEN WORK.) Copy, and write the products for these examples. Prove your work if you need to.

EXERCISE

1.	2.	3.	4.	5.	6.
205 × 3	391 × 2	123 × 6	169 × 3	121 × 8	132 × 5
7.	**8.**	**9.**	**10.**	**11.**	**12.**
\$1.68 × 3	102 × 4	\$.68 × 2	275 × 3	\$.23 × 9	132 × 6

PROBLEM SCALE NO. 2

157. Problems about Home and School. (WRITTEN WORK.) If you work every problem correctly, you will earn 30 points. Find your score by adding the numbers printed at the right of the problems you worked correctly. Then look at the Standards at the bottom of page 209, and find out for yourself how well you have done your work.

1. Florence had 7 dolls, Jane had 3 dolls, and Helen had 5 dolls. How many dolls did the girls have all together? (3)

2. Dan made a wren house. He used four pieces of wood for the sides, one piece for the floor, and one piece for the roof. How many pieces of wood did he use all together? (3)

3. On "Doll Day," Florence, Jane, and Helen each took a girl doll and a boy doll to school. How many dolls did the three girls take to school? (4)

4. Sally knows 9 different kinds of birds. Fanny knows 15 different kinds of birds. How many more kinds of birds does Fanny know than Sally? (4)

5. There were 15 girls in the second grade of the Thompson School. Each girl took two dolls to school one day. How many dolls did these 15 girls take to school that day? (4)

6. Seventeen boys each took 3 toys to school for the first-grade children to enjoy at a party. How many toys did the 17 boys take to school? (5)

7. Mary spent 10 cents for sweet-pea seed and 5 cents for morning-glory seed. How much did Mary spend for seeds? (7)

STANDARDS

Superior work:	23–30 points	Slow work:	13–15 points
Good work:	20–22 points	Inferior work:	0–12 points
Average work:	16–19 points		

SELF-TESTING DRILL NO. 8

158. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. Find your score and make your record on the Score Card. **Try to beat all your past records.**

1.	2.	3. *Add:*	4.	5.
52	54	50	204	98
×3	×2	93	×3	246
		64		509
		91		78

6. 9 times 0 = ?

7. 3 × ? = 27

8.	9.	10.	11.	12.
Multiply:	3	930	823	710 minus
96 by 3	×?	−598	−265	371 = ?
	12			

13. A fruit man gave 12 apples to each of four boys. How many apples did the man give to all the boys?

14. 208 + 497 = ?

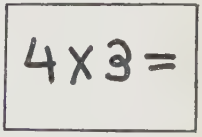
15. A gardener planted some sweet corn in 3 rows. In each row there were 103 hills of corn. How many hills were there in these rows?

STANDARDS

Number correct....	0	1–5	6–7	8	9	10	11	12	13	14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

If you missed on multiplication examples, you can improve your score by learning the multiplication facts better. Practice Article 292.

159. Home Practice on Multiplication. (A SILENT READING LESSON.) Jessie worked on her arithmetic at home. Her mother and brother helped her. She cut 64 little pieces of paper about 3 inches long and 2 inches wide like the picture at the right, and wrote the examples on them until she had all of the 64 shown on page 212. She then wrote the product on the back of each slip. Her mother looked at all of the products to see that they were correct.



Then Jessie took the 64 slips and, looking at the sides with examples on them, said the products as fast as she could while she placed the slips on the table.

If Jessie made a mistake, her mother said "Stop." Jessie had to lay that slip on a separate pile. When she finished the 64, she studied the ones she had missed. Then she tried them all again. She practiced every night until she could give all the products without a mistake as fast as she could lay down the slips.

Don't you think it would be fun to make some slips like this and run races with yourself or some one else? Try it. Keep the slips to use later.

160. Review of 64 Multiplication Facts. (ORAL PRACTICE.) Do you remember the 100 addition facts and 100 subtraction facts that you learned? There are 100 multiplication facts, too, that you will need to know. You should know 64 of them now.

In the big box below there are 100 little squares. 64 of these are filled with the multiplication facts you have already learned. The other 36 little squares with crosses or circles in them show that there are 36 more that you will learn later. Aren't you glad you know 64 of them and have only 36 to learn? There are 11 new multiplication facts that belong in the squares with the circles. You will learn these soon.

Give the products quickly:

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)	(*i*)	(*j*)
1.	0×0	1×2	0×3	4×3	2×4	2×0	2×6	4×1	6×0	5×2
2.	1×4	1×1	1×5	1×8	1×0	0×2	1×3	1×9	0×1	1×7
3.	2×3	8×1	2×2	1×6	0×4	2×5	0×6	2×9	2×7	2×8
4.	3×0	3×2	3×1	3×3	3×5	3×6	3×4	3×8	3×7	3×9
5.	7×2	0×7	2×1	4×2	×	○	×	×	×	×
6.	6×1	6×3	0×9	7×3	○	○	○	○	○	○
7.	0×8	9×1	8×3	8×0	×	○	×	×	×	×
8.	5×3	5×0	9×3	0×5	×	○	×	×	×	×
9.	8×2	6×2	9×0	9×2	×	○	×	×	×	×
10.	7×0	5×1	4×0	7×1	×	○	×	×	×	×

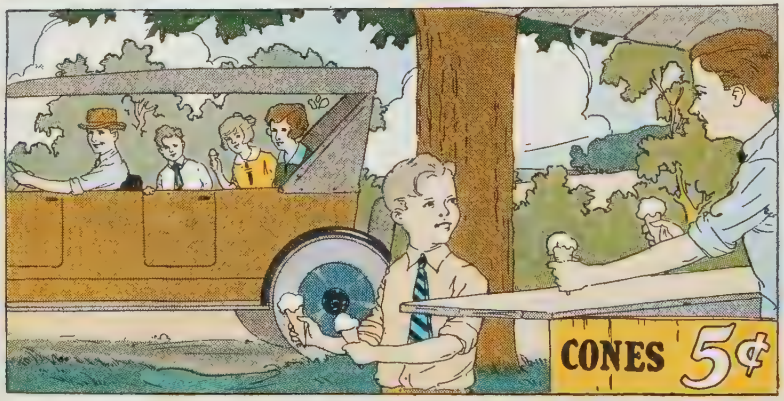
161. Rapid Drill. (CLASS WORK.) Your teacher will tell you how long you may study these examples before she calls on you. Don't use your pencil.

	(*A*)	(*B*)	(*C*)	(*D*)	(*E*)	(*F*)
1.	1×5	$9-7$	$9+8+5$	$11-9$	2×9	$6+7+8$
2.	$12-4$	$8+6+7$	$9\times3+2$	$6+29$	$11-7$	$8+5+7$
3.	5×3	$7+9+5$	$10-7$	$18+9$	0×8	$13-8$
4.	$19+7$	$14-9$	$15-6$	$17-8$	22×3	$98-53$
5.	$8+4+9$	$11-8$	2×7	$13+7+3$	$70-24$	$13+68$
6.	3×5	$10-3$	$15+4+8$	$71-46$	34×2	$33+17$
7.	$7+6+4$	$6\times3+1$	$90-79$	$28+54$	$14-8$	$8\times2+2$
8.	$17-9$	$9+5+9$	$98-49$	22×5	$39+36$	$16-9$

FIVE IN MULTIPLICATION

162. Five in Multiplication. (SILENT STUDY.) See if you can learn everything in this article without help from your teacher.

You have already learned the answers to multiplication examples using 2, 3, 1, and 0. Now you will learn to use 5 in multiplication.



The Ross family stopped at this stand to buy ice cream cones. Mr. Ross told Carl to get 5 cones. How much money did Carl need? How many are five 5's?

Here is another chance to learn some short-cuts:

Count by 5's to 50.

Learn the products for multiplication examples 1 to 10 on the next page. If you don't know them, look at the Table below Example 20. You know the ones with the arrows pointing at them. Study the other six until you can say them quickly.

➤➤1. One 5 is.....

➤➤2. Three 5's are.....

3. Six 5's are.....

➤➤4. Two 5's are.....

5. Four 5's are.....

6. Five 5's are.....

7. Eight 5's are.....

8. Nine 5's are.....

9. Seven 5's are.....

➤➤ 10. $0 \times 5 =$ .....

How much would these things cost?

11. 4 sacks of popcorn at 5¢ a sack.

12. 6 oranges at 5¢ each.

13. 3 pencils that cost 5¢ apiece.

14. 7 firecrackers at 5¢ each.

15. 5 toys that cost 5¢ each.

16. 9 five-cent postage stamps.

17. 8 rides on a street car at 5¢ each.

Give the answers to these questions:

18. How many cents are in 2 nickels?

19. How many cents are in 5 nickels?

20. How many cents are in 7 nickels?

TABLE

No 5 is	One 5 is	Two 5's are	Three 5's are	Four 5's are	Five 5's are	Six 5's are	Seven 5's are	Eight 5's are	Nine 5's are
0	5	10	15	20	25	30	35	40	45

163. Problems. (WRITTEN WORK.) If you work hard to get the correct answers to these problems, it will help you on your next Problem Scale.

1. Mary saved 10¢ every week to put in the bank. In four weeks how much money had she saved?

2. One day the second-grade children and their mothers ate a picnic lunch at school. There were 32 children, teachers, and mothers in all. The mothers made four sandwiches for each person. How many sandwiches did they make?

3. The cost of the ice cream was divided among 30 of the people. Each one's share was 9¢. How much did the ice cream for the picnic cost?

4. One quart of ice cream will serve eight people. How many people will five quarts of ice cream serve?

5. Five auto loads of people drove to a lake to spend the Fourth of July. Each auto carried seven people. How many were in the party?

6. Each school room at Franklin School has three extra chairs for visitors. There are 13 rooms in the school. How many chairs does Franklin School have for visitors?

HARDER PROBLEMS FOR GOOD WORKERS

7. The third grade of Maple Grove School wanted to have a school garden. They ordered 12 penny packages of flower seeds, and 8 packages of seeds for

vegetables, at 5¢ each. How much money did they need to pay for the seeds they had ordered?

8. Mr. Brown paid 3¢ a quart for picking strawberries. One afternoon Nancy picked 3 quarts, Ruth, 5 quarts, Dan, 15 quarts, and Tom, 12 quarts.

(*a*) How much money did each receive?
(*b*) How much did Mr. Brown pay all of them?

9. Helen and her mother went to the market one morning. They bought 3 pounds of butter at 48¢ a pound, 2 heads of lettuce at 15¢ a head, 1 dozen eggs at 38¢ a dozen, 2 bunches of celery at 9¢ a bunch, and a 5-pound roast at 40¢ a pound.

How much did they pay for each thing they bought?

10. To beautify the grounds, the children in Webster School bought shrubs for each of the three sides of the grounds. The amount needed for each side was $1.25. How much did they pay for the shrubs?

164. Practice on 5 in Multiplication. (ORAL WORK.) The six new multiplication facts that you learned in Article 162 are shown in Column (*A*). They are equal to the multiplication facts in Column (*B*). Learn the ones in Column (*B*).

Give the numbers that belong on the blanks:

	(*A*)		(*B*)
You Know These	$4\times5=$		$5\times4=$ .....
	$5\times5=$		.....
	$7\times5=$	Learn These	$5\times7=$ .....
	$6\times5=$		$5\times6=$ .....
	$9\times5=$		$5\times9=$ .....
	$8\times5=$		$5\times8=$ .....

Put the 11 multiplication facts shown above on slips of paper with products on the backs. Practice until you can give the products quickly. Then put these slips with the others mentioned on page 211, making 75 in all.

EXERCISE

Give the missing numbers:

(*A*)	(*B*)	(*C*)
1. $5\times$ ..... $=10$	8. ..... $\times5=35$	15. $10=5\times$ .....
2. ..... $\times5=15$	9. $5\times$ ..... $=40$	16. $15=$ ..... $\times5$
3. $6\times$ ..... $=30$	10. ..... $\times6=30$	17. $35=5\times$ .....
4. $5\times$ ..... $=20$	11. ..... $\times5=45$	18. $40=5\times$ .....
5. ..... $\times5=5$	12. ..... $\times5=40$	19. $20=$ ..... $\times5$
6. ..... $\times5=10$	13. $5\times$ ..... $=45$	20. $45=5\times$ .....
7. $5\times$ ..... $=25$	14. $30=$ ..... $\times6$	21. $25=5\times$ .....

22. $5\times\_\_\_\_\_=15$	**25.** $5\times\_\_\_\_\_=35$	**28.** $5\times\_\_\_\_\_=30$
23. $5=5\times\_\_\_\_\_$	**26.** $45=9\times\_\_\_\_\_$	**29.** $7\times5=\_\_\_\_\_$
24. $8\times\_\_\_\_\_=40$	**27.** $5\times\_\_\_\_\_=0$	**30.** $\_\_\_\_\_\times5=20$

PROBLEM SCALE NO. 3

165. Problems about the Wilson School. (WRITTEN WORK.) If you work every problem correctly, you will earn 35 points. Find your score by adding the numbers printed at the right of the problems you worked correctly. Then look at the Standards, and find what kind of problem work you are doing.

1. Kate was the best batter on the girls' baseball team. She hit the ball four times one day, three times the next day, and six times another day. How many times did Kate hit the ball on these 3 days? (4)

2. Wilson School won 8 baseball games and Central School won 13 baseball games. How many more games did Central School win than Wilson School? (4)

3. James was asked to pass the paper each day at school. He needed 7 sheets of paper for the first row, 6 for the second row, 8 for the third row, 7 for the fourth row, and 7 for the fifth row. How many sheets of paper did he need for all these rows? (4)

4. After school Grace sharpened the pencils for the children. Monday she sharpened 16 pencils, Tuesday 3 pencils, Wednesday 5 pencils; Thursday she sharpened none; Friday she sharpened 6 pencils. How many pencils did she sharpen that week? (4)

5. Each day Nancy counted the scissors to be sure that not one was lost. The third grade had 43 scissors. One day when Nancy counted them, she had only 39 scissors. How many were missing? (4)

6. One spring the first team played seven baseball games. Jim made 21 runs all together. Tom made 16. How many more runs did Jim make than Tom? (4)

7. In the third grade of Wilson School there were 13 boys who were good ball players. Nine of these boys were chosen to play on the first team. How many of the 13 boys did not make the first team? (5)

8. There were 35 children in the third grade of the Franklin School. Each child bought a pencil costing 3¢. How much did the children spend in all for these pencils? (6)

STANDARDS

Superior work:	29–35 points	Slow work:	13–20 points
Good work:	25–28 points	Inferior work:	0–12 points
Average work:	21–24 points		

166. Getting Ready to Use 5 in Multiplication. (ORAL PRACTICE.) When you carry in multiplication, you multiply and then add the number carried. In Article 144 you practiced on 66 examples that looked like this: $3\times2+1$. In multiplying by 2 or 3, you need to use those 66 examples. But when you use 5 in multiplying, you need to know 72 more. They are printed in this exercise. Give the answers to them.

EXERCISE

	(*A*)	(*B*)	(*C*)	(*D*)
1.	$5\times1+2$	$5\times7+3$	$9\times5+1$	$9\times5+4$
2.	$5\times0+2$	$5\times8+2$	$4\times0+2$	$5\times3+3$
3.	$5\times1+3$	$5\times7+2$	$5\times2+2$	$9\times5+2$
4.	$5\times7+1$	$5\times9+1$	$5\times9+3$	$5\times2+4$
5.	$5\times1+4$	$5\times8+3$	$5\times3+2$	$4\times5+1$
6.	$5\times0+4$	$5\times9+2$	$9\times5+3$	$5\times3+4$
7.	$5\times8+1$	$5\times8+4$	$5\times2+3$	$5\times5+1$
8.	$6\times5+3$	$5\times5+4$	$8\times5+3$	$8\times5+1$
9.	$4\times5+2$	$5\times6+3$	$9\times0+4$	$7\times5+1$
10.	$5\times9+4$	$5\times4+3$	$6\times1+3$	$8\times5+2$
11.	$6\times5+2$	$5\times6+4$	$9\times2+4$	$5\times6+1$
12.	$4\times1+2$	$5\times4+1$	$7\times0+3$	$8\times1+4$
13.	$5\times5+2$	$5\times6+2$	$6\times0+3$	$7\times5+2$
14.	$6\times5+1$	$5\times4+2$	$4\times2+2$	$4\times3+2$
15.	$5\times5+3$	$5\times7+4$		

Give the answers, adding 3 to each product:

Add 3							
	3	1	2	2	0	3	5
	×6	×7	×7	×6	×5	×7	×7

Give the answers, adding four to each product:

Add 4							
	3	0	3	2	1	5	4
	×8	×8	×9	×8	×9	×8	×5

167. Practice with 5 in Multiplication. (WRITTEN WORK.) See if you can get every answer correct in the examples below.

Find the products:

1. 179	2. 105	3. 51	4. 140	5. 187	6. 150
5	6	4	5	5	4
7. $.35	8. $1.64	9. 90	10. $.51	11. $1.35	
9	5	5	7	8	

168. General Practice in Multiplication. (WRITTEN WORK.) If the examples in Article 167 were hard for you, find the products for the examples below. This will give you extra practice.

1. 276	2. $.46	3. 101	4. 152	5. $1.15
2	3	6	4	7
6. 15	7. $.51	8. $1.26	9. $.30	10. 135
9	8	5	8	6

SELF-TESTING DRILL NO. 9

169. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. Find your score and make the record on the Score Card. **Try to beat all your past records.**

1. 20×5

2. 23×6

3. 203×3

4. How many tens in 100?

5. 95 + 89 + 50 + 8

6. 68 + 287 + 6 + 450

7. 254×3

8. $816 - 536$

9. 135×4

10. Multiply 52 by 7

11. $929 - 670$

12. $32 \times 4 = ?$

13. $621 - 254 = ?$

14. 55 and 33 plus $85 + 96 = ?$

15. *Write in a column and add:*

(*a*) four
(*b*) six hundreds, three tens, and no ones
(*c*) three hundreds, no tens, and nine ones
(*d*) two tens and seven ones.

STANDARDS

Number correct..	0	1–3	4–5	6–7	8	9	10	11	12	13–14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

If you missed subtraction, practice Articles 290 and 291.

PROBLEM SCALE NO. 4

170. Problems about a Geography Collection. (WRITTEN WORK.) If you work every problem correctly, you will earn 25 points. Find your score by adding the numbers printed at the right of the problems you worked correctly. Then look at the Standards and see what kind of work you are doing.

A class in geography had collected many things for their work. The pupils thought that other children would like to learn about these things, too.

1. The pupils had collected 4 kinds of wood, 7 stones, 2 kinds of rock, and 3 kinds of fuel. They wished to have tags with the name on each thing in the collection. How many tags did they need? (3)

2. Children from four other classes came to see the collection. Some boys explained the things to the children. It took 12 minutes for each of the four classes. How much time did it take for all four classes? (4)

3. Children who saw the collection offered to bring some things they had. They brought: 2 kinds of rubber, 1 piece of ivory, 8 stones, 5 kinds of wood.

How many more tags were needed? (4)

4. Lois Lane took an outdoor picture of the class. She made 15 copies of the picture, and the teacher sold them for her to the pupils for 5 cents each. How much money should the teacher have given to Lois? (7)

5. The teacher gave Lois a $1.00 bill. How much change should Lois have given to the teacher? (7)

STANDARDS

Superior work:	18–25 points	Slow work:	4–7 points
Good work:	11–17 points	Inferior work:	0–3 points
Average work:	8–10 points		

FOUR IN MULTIPLICATION

171. Four in Multiplication. (Class Work.) Add the five columns below and learn the products for the examples at the right. You know some of the 4's. These five are new ones.

The New 4's

4	6	7	8	9
4	6	7	8	9
4	6	7	8	9
4	6	7	8	9

The Short-Cuts

Learn These

$4\times9=$
$4\times8=$
$4\times7=$
$4\times6=$
$4\times4=$

Study the examples until you can say the products quickly.

Give the missing numbers:

1. Four 8's =
2. Four 6's =
3. Four 4's =
4. Four 7's =
5. Four 9's =
6. $4\times\ldots\ldots=16$
7. $4\times\ldots\ldots=24$
8. $4\times\ldots\ldots=36$
9. $4\times\ldots\ldots=28$
10. $4\times\ldots\ldots=32$
11. $28=4\times\ldots\ldots$
12. $32=4\times\ldots\ldots$
13. $16=4\times\ldots\ldots$
14. $24=4\times\ldots\ldots$
15. $36=4\times\ldots\ldots$

In studying the 2's, 3's, and 5's you found out that if you turn a multiplication fact around, it gives the same answer. $4\times6=6\times4$, doesn't it? So, when you learn one multiplication fact, you sometimes learn another one at the same time. If you have learned the five below, you should know four others.

The Five You Know		The Four Others to Learn
4×9	equals	9×4
4×8	equals	8×4
4×7	equals	7×4
4×6	equals	6×4
4×4		

Give the products:

1. $4\times7=$
2. $6\times4=$
3. $9\times4=$
4. $4\times8=$
5. $4\times4=$
6. $4\times6=$
7. $4\times9=$
8. $7\times4=$
9. $8\times4=$

Put the 9 multiplication facts shown above on slips of paper with products on the backs. Practice until you can give the products quickly. Then put these slips with the others mentioned on pages 211 and 218, making 84 in all.

172. Getting Ready to Use 4 in Multiplication. (ORAL PRACTICE.) If you can give the answers to these examples quickly, it will be easy for you to use 4 in multiplying. Perhaps you are slower than you need to be in giving answers to examples like these, because you say or think too many words.

How do you get the answer to $4\times7+3$? Do you say to yourself, "4×7 is 28, 28 and 3 are 31"? A quicker way is to **think** 28 as you see 4×7. Then all you have to do is to add 3, and you have 31. Just say to yourself "28, 31." Isn't that quicker?

Give the answers in that way as you practice on the 46 examples below.

EXERCISE

	(*A*)	(*B*)	(*C*)	(*D*)
1.	$4\times9+1$	$8\times3+3$	$4\times8+2$	$8\times4+2$
2.	$9\times0+3$	$4\times6+1$	$8\times4+4$	$6\times2+2$
3.	$4\times3+3$	$8\times0+3$	$4\times6+2$	$4\times6+3$
4.	$6\times4+2$	$4\times1+3$	$4\times9+2$	$6\times3+2$
5.	$4\times8+1$	$9\times4+3$	$6\times4+1$	$9\times3+3$
6.	$9\times2+3$	$4\times7+2$	$4\times8+3$	$4\times4+2$
7.	$4\times9+3$	$8\times4+3$	$4\times4+3$	$4\times7+3$
8.	$8\times2+3$	$6\times1+2$	$9\times1+3$	$6\times4+3$
9.	$4\times7+1$	$4\times5+3$	$8\times4+1$	$7\times4+2$
10.	$4\times0+3$	$7\times4+3$	$9\times4+4$	$6\times0+2$
11.	$9\times4+1$	$9\times4+2$	$4\times2+3$	$8\times1+3$
12.	$7\times4+1$	$4\times4+1$		

173. Practice with 4 in Multiplication. (WRITTEN WORK.) Remember to do neat work when you copy examples.

EXERCISE

Copy and multiply:

1.	2.	3.	4.	5.
149	140	154	121	$.78
4	5	6	4	4
6.	**7.**	**8.**	**9.**	**10.**
206	148	$.84	126	$1.09
4	5	4	4	4
11.	**12.**	**13.**	**14.**	**15.**
140	125	$.79	54	$1.40
6	7	5	8	7

174. Extra Practice in Multiplication. (WRITTEN WORK.) Find the products to the examples below if you made mistakes in Article 173.

1.	2.	3.	4.	5.
$1.68	290	746	$.89	67
2	3	1	4	5
6.	**7.**	**8.**	**9.**	**10.**
$.78	34	50	$.47	109
3	7	8	4	5

175. Review of 84 Multiplication Facts. (ORAL PRACTICE.) On page 212 you practiced on 64 of the 100 multiplication facts you are learning. Since then you have learned 20 more. By this time you should know 84 multiplication facts so that you can say them rapidly and without a mistake.

There are two ways of giving the products. In the box below look at column (*c*). Reading down this column, you may say, "2×8 is 16," "2×6 is 12," "1×0 is 0," and so on, or you may just give the products like this, 16, 12, 0, 0, and so on.

EXERCISE

Give the products:

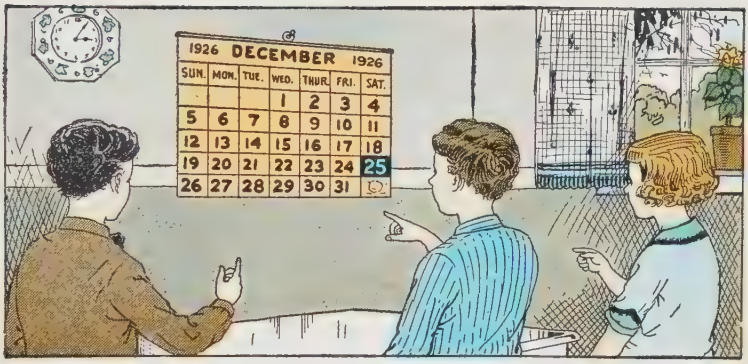
	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)	(*i*)	(*j*)
1.	5×2	1×7	2×8	3×9	6×0	0×1	2×7	3×7	4×1	1×9
2.	2×9	3×8	2×6	1×3	0×2	3×4	0×6	2×5	2×0	3×6
3.	2×4	7×0	1×0	3×5	0×4	4×3	1×6	1×8	3×3	4×2
4.	7×3	2×2	9×0	9×1	3×0	7×2	6×1	0×8	5×3	8×2
5.	8×0	3×1	1×2	5×0	4×4	9×5	8×4	4×9	8×5	6×4
6.	0×5	2×1	1×1	6×2	6×5	4×7	5×7	5×9	5×6	5×8
7.	9×2	0×9	8×1	5×1	9×4	7×4	×	×	×	×
8.	7×1	8×3	3×2	0×0	7×5	4×5	×	×	×	×
9.	0×3	9×3	0×7	1×4	4×6	5×5	×	×	×	×
10.	1×5	4×0	6×3	2×3	5×4	4×8	×	×	×	×

176. Rapid Drill. (CLASS WORK.) Study until your teacher says "Ready." Then give the answers.

	(A)	(B)	(C)	(D)	(E)	(F)
1.	6×4	$9+6+8$	$10-8$	$9\times4+3$	$14+8+8$	$14-9$
2.	$12-6$	$9\times0+4$	$7+5+9$	$17-9$	$15-6$	$12+8+5$
3.	$11-7$	$17+9$	$4\times6+3$	$9+8+5$	$7\times4+2$	$13-8$
4.	$12+6+4$	$9\times5+4$	$13+6+3$	$12-8$	$15+3+3$	$17-8$
5.	$5\times8+4$	$17+4+9$	$4\times7+3$	$15-9$	$82-29$	$26+38$
6.	$9+9+7$	$5\times4+3$	$15-7$	$5\times8+2$	$49+17$	$81-18$

THE CALENDAR

177. Counting Days on the Calendar. (CLASS WORK.) Did you ever count the days before Christmas, the Fourth of July, or a camping trip? If you know how to use a calendar it will help you to plan for such days.



1. What month does this calendar show?

2. How many days are there in this month?

3. On what day of the week did this month begin?

4. On what day of the week did the month end?

5. On what day of the week was the 13th?

6. On what day in this month was Christmas?

7. School closed for vacation on Friday the 17th. That day the children counted the days before Christmas. How many days did they have to wait?

8. Two days before Christmas the children were going to their grandmothers'. On what day of the month did they go?

9. Name the days of the week.

10. Sylvia takes a piano lesson every Friday. How many did she take during the month shown above?

11. How many Tuesdays were there in this month?

SUMMARY

178. General Review. (Written Work.) Write the answers to the following problems and examples. Work hard to get every answer correct. In some of them your answer will be just one word. It will either be "yes" or "no." Read carefully. Be sure you **know** what to do before you try to get any answer.

1. Add three numbers and check the answer.

2. Find the difference of \$7.00 and \$2.67 and check the answer.

3. Prove this example by addition. ➳

$$\begin{array}{r} 48 \\ \times 3 \\ \hline 144 \end{array}$$

4. Multiply \$.67 by 3.

5. Is 17 the sum of 8 and 7?

6. Is 5 the difference of 8 and 3?

7. Does one dollar equal ten dimes?

8. Write the number that equals seven tens and six ones.

9. What is the product of 236 and 3?

Copy and write the correct signs on the dotted lines:

10. $17 \_\_\_\_ 1 = 17$
11. $9 \_\_\_\_ 0 = 0$
12. $9 \_\_\_\_ 1 = 8$
13. $5 \times 4 \_\_\_\_ 3 = 23$
14. $17 = 9 \_\_\_\_\_ 8$
15. $207 \_\_\_\_ 4 = 211$
16. $69 \_\_\_\_ 13 = 56$
17. $36 \_\_\_\_ 3 = 108$
18. $6 \_\_\_\_ 0 + 3 = 3$

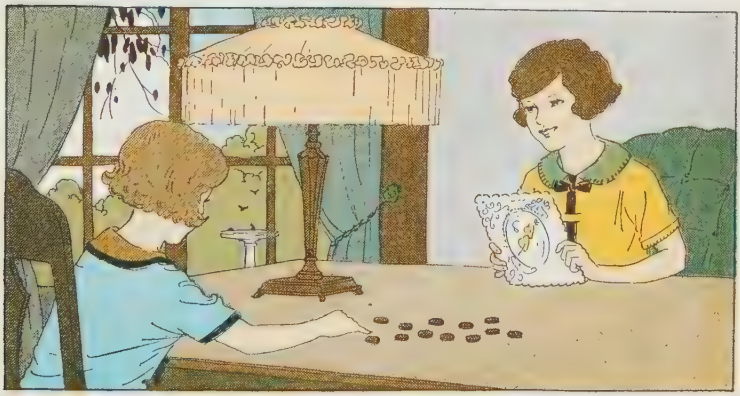
19. How many days are in 2 weeks plus 4 days?

20. 813 minus 655 = ?

PART TWO

CHAPTER VIII

FIRST STEPS IN DIVISION. USE OF INCH, FOOT, YARD. EASY FRACTIONS



WHAT IT MEANS TO DIVIDE BY 2 AND 3

179. Using 2 and 3 in Division. (Class Work.) Clara said her valentines cost 2 cents each. Jane is trying to figure out how many 2¢ valentines she can buy with the 12 cents she has saved.

1. How many cents has Jane?

2. Do you want to learn an easy way to find how many valentines she can buy with her 12 cents if she pays 2¢ for each one? Look on the next page.

There are several ways to work this kind of problem, but you like to learn short-cuts, don't you? Below you will find a slow way and the quick way.

This is a slow way to find out. You could write the work like this:

2 cents will buy 1 valentine
2 cents will buy 1 valentine
2 cents will buy 1 valentine
2 cents will buy 1 valentine
2 cents will buy 1 valentine
2 cents will buy 1 valentine

6×2 cents $= 12$ cents } 12 cents will buy 6 valentines

Wouldn't it be quicker to think, "How many 2's in 12?" The answer is 6.

There are six 2's in 12.

There is another way to write "How many 2's in 12?" It saves time and space. Here it is: ➙ $2\overline{)12}$

$2\overline{)14}$ means: How many 2's in 14?

$2\overline{)18}$ means: How many 2's in 18?

Tell what these mean:

3.	4.	5.	6.	7.	8.
$2\overline{)16}$	$3\overline{)12}$	$2\overline{)10}$	$2\overline{)12}$	$3\overline{)6}$	$2\overline{)8}$

When examples are written like those at the bottom of page 234, the answers are placed just above the straight line, like this: ⟶ The answer is 7. There are seven 2's in 14.

$$\begin{array}{r} 7 \\ 2\overline{)14} \end{array}$$

Choose a pupil to go to the blackboard and write the next three examples, showing the answers. Watch to see if the work is done correctly.

$2\overline{)12}$ $3\overline{)15}$ $2\overline{)6}$

There is even a quicker way to think out the answers to such examples.

Look at this example: $3\overline{)18}$. In getting the answer, think, "3 into 18, 6 times." Isn't that quicker than to think, "How many 3's are there in 18?"

Read and give the answers:

9. 2 into 8	**15.** $2\overline{)14}$	**21.** 2 into 18
10. 3 into 6	**16.** 3 into 3	**22.** $3\overline{)24}$
11. 2 into 10	**17.** $2\overline{)16}$	**23.** $2\overline{)6}$
12. $3\overline{)12}$	**18.** $3\overline{)15}$	**24.** 3 into 21
13. 2 into 2	**19.** 2 into 4	**25.** $3\overline{)27}$
14. $3\overline{)9}$	**20.** $2\overline{)12}$	**26.** 3 into 18

☞ **Examples like 9 to 26 above are called "division" examples.**

PROBLEM SCALE NO. 5

180. Problems about Library Books. (WRITTEN WORK.) If you work every problem correctly, you will earn 50 points. Find your score as you were told to do in Problem Scales 1 to 4.

1. During one half year Harold read three fairy books, two books of verse, four animal books, and five other books. How many books did he read in all? (4)

2. The number of books shown below were sent from the public library to the different classes of the Lincoln School at the beginning of the year:

CLASS	NUMBER OF BOOKS	CLASS	NUMBER OF BOOKS
3*B*	30	5*B*	38
3*A*	25	5*A*	35
4*B*	35	6*B*	43
4*A*	29	6*A*	20

How many books were sent to all these classes? (5)

3. In January a lady from the public library came to the school to see how many books the children had read. A book was counted once every time it was read by any pupil. This is the record for the third and fourth grade classes.

CLASS	TIMES BOOKS WERE READ	CLASS	TIMES BOOKS WERE READ
3*B*	30	4*B*	127
3*A*	28	4*A*	297

How many times had books been read by all of these four classes? (5)

4. The report for the other four classes was:

Class	Times books were read
5*B*	126
5*A*	159
6*B*	213
6*A*	135

How many times had books been read by all of these four classes? (5)

5. Some of the books needed mending. Two boys offered to do it. The teacher gave them three spools of mending tape. Each spool held 36 feet, and the boys used 2 spools. How many feet of tape did they use? (5)

6. "Alice in Wonderland," "Eskimo Twins," "The Little Lame Prince," and 13 other books needed mending. Each boy mended an equal number. How many books did each boy mend? (6)

7. At the close of the year when the library books were counted, three could not be found. The books cost 95 cents each. How much did new copies of these three books cost? (6)

8. Which class of Lincoln School used its library books most? (7)

9. What was the number of times books had been read by all classes? (See Problems 3 and 4.) (7)

STANDARDS

Superior work:	26–50 points	Slow work:	5–9 points
Good work:	19–25 points	Inferior work:	0–4 points
Average work:	10–18 points		

181. Word and Sign Used in Division. (CLASS WORK.) When you read the words add, subtract, and multiply, or see these signs, $+$, $-$, $\times$, you know what to do. There is another important word and another sign that you must understand.

The word is **divide,** and the sign is $\div$. It is called the **division** sign.

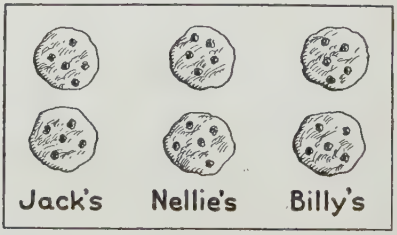
1. Name things that you sometimes divide with your playmates.

2. If you had 6 cookies and you wanted to divide them among 3 playmates so that each one would have the same number, how many cookies would you give to each playmate?

The way to divide them is shown in the two pictures below.

The six cookies are shown below.

Here are the six cookies divided equally among three playmates.



Do you see that if you divide 6 cookies **equally** among 3 persons, each one will get 2 cookies?

This is another way to say it: **6 divided by 3 = 2**
This is a short way to write it: **6 ÷ 3 = 2**

It means the same as $3\overline{)6}$, or "There are two 3's in 6."

3. James divided 9 sticks of candy among his three younger brothers. He gave Dick 4 sticks, Harold 3 sticks, and little John 2 sticks. Did he divide the candy **equally** among the three boys?

4. Don's father divided 8 apples equally among four girls, Lucy, Bess, Julia, and Marie. Choose a pupil to go to the blackboard and show in a picture how many apples each girl got.

5. Choose another pupil to write on the blackboard the figures and the answer for Problem 4, using the division sign.

182. Using What You Know to Get Answers in Division. (Class Work.) Did you ever think how hard it would be to learn new things if you didn't use what you already know? Do you remember how easy it was for you to learn to subtract because you knew how to add? After you had learned that $7+4=11$, it didn't take long to get the answer to $11-7$, did it? Well, you can learn division easily, too, if you remember your multiplication.

At the top of the next page you will see how easy it is to put a division example in the form of multiplication and then get the answer.

Division		Multiplication that you know
$15 \div 5$ may be written	$5\overline{)15}$ or 5 into 15	Three 5's are 15.

What is the answer to the division example?

Now let us look at two problems that use the same figures. They are both division problems. Read the problems and the hints. Watch to see how you can make use of what you know about multiplication to get the answers.

Problems	Hints Using What You Know
1. How many 3¢ stamps can you buy for 18 cents?	(*a*) Every time you buy one of these stamps it costs 3¢. (*b*) How many times can you buy one 3¢ stamp with 18 cents? (*c*) What number times $3¢ = 18¢$? (*d*) How many 3's in 18? (*e*) This is the same as $18 \div 3$, or $3\overline{)18}$. (*f*) What is the answer?
2. A boy has 18 radishes to put into 3 bunches. He wants to put the same number in each bunch. How many should be put in each bunch?	(*a*) 18 is divided into 3 equal parts. (*b*) 18 is divided by 3. (*c*) $18 \div 3 = 3\overline{)18}$, or how many 3's in 18? (*d*) What is the answer?

Give the answers to the following:

1. $14 \div 2 =$ (Think: 2 into 14 goes how many times, or how many 2's in 14?)

2. $21 \div 3 =$ (Think: 3 into 21 goes how many times, or how many 3's in 21?)

3. $24 \div 3 =$ (Think: 3 into 24 goes how many times, or how many 3's in 24?)

4. $27 \div 3 =$ (What should you think in this example?)

5. $10 \div 2 =$ **6.** $3 \div 3 =$ **7.** $16 \div 2 =$ **8.** $12 \div 2 =$

9.
$2 \times 4 =$ .....
How many 2's in 8?
$8 \div 2 =$ .....
$2\overline{)8}$

12.
$3 \times 6 =$ .....
How many 3's in 18?
$18 \div 3 =$ .....
$3\overline{)18}$

10.
$3 \times 5 =$ .....
How many 3's in 15?
$15 \div 3 =$ .....
$3\overline{)15}$

13.
$1 \times 3 =$ .....
How many 1's in 3?
$3 \div 1 =$ .....
$1\overline{)3}$

11.
$2 \times 8 =$ .....
How many 2's in 16?
$16 \div 2 =$ .....
$2\overline{)16}$

14.
$2 \times 9 =$ .....
How many 2's in 18?
$18 \div 2 =$ .....
$2\overline{)18}$

15. 9 divided by 3 =

16. 12 divided by 3 =

17. 6 divided by 2 =

18. 2 divided by 2 =

19. 21 divided by 3 =

20. 12 divided by 2 =

SELF-TESTING DRILL NO. 10

183. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. Keep trying to beat your past records.

Find your score and make your record on the Score Card.

1.	2. *Add:*	3.	4.	5.
6	398	896 − 618 =	4	9
97	89		19	250
24			2	245
			274	77

6.	7.	8.	9.	10.
131	102	114	35	102
×5	×4	×5	×8	×6

11.	12.	13.	14. *Subtract:*
24 + 9 = ?	416	903	398
	−388	−644	89

15. How many hundreds in 1000?

STANDARDS

Number correct....	0	1–6	7	8	9	10	11	12	13	14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

Did you make mistakes in any of the multiplication examples? Don't let the multiplication facts trip you.

184. Problems Using Multiplication and Division. (ORAL WORK.) Give the answers to these problems. In the division problems tell what the division is and how you use what you know about multiplication to get the answer. A sample answer is given after the first one.

It will help you if you turn right now to page 195 and read again the four questions to ask yourself when you work problems. What word should you add to Question (*b*) in the list on page 195 in working the problems in this article?

1. Jim is looking at some marbles that cost 3 cents each. How many can he buy for 24 cents?

SAMPLE ANSWER. 24¢ ÷ 3¢. Think: How many 3's in 24? Jim can buy 8 marbles.

2. How many 2-cent pencils can you buy for 10¢?

3. Nellie's aunt bought 12 peanut bars for three children. She divided them equally among the children. How many bars did each child get?

4. Frank went down town to shop for his mother. After buying eggs and a tablet, he bought two-cent stamps with the change he had left from fifty cents. This is what he paid for eggs and the tablet: eggs 18¢, tablet 20¢.

(*a*) How much money did he spend for eggs and the tablet?

(*b*) How much change did he get from the fifty cents?

(*c*) How many two-cent stamps did he buy?

5. Mrs. Johnston colored 18 Easter eggs for Helen and Madge, and gave each girl the same number of eggs. How many Easter eggs did Helen get?

6. There were 16 girls in the fifth grade. When they played Overhead Relay, the teacher divided them into 2 equal rows. How many girls were in each row?

7. Twenty-seven third-grade children and three teachers went for a bird hike. The children decided to divide into three equal groups with one teacher in each group. How many children did each teacher take?

8. Robert and Hugh took turns, a day at a time, gathering eggs. In ten days how many times would each boy gather the eggs?

9. John, Frank, and Ray went on a hike. They took 9 sandwiches, 12 cookies, 3 boiled eggs, and 6 apples.

(*a*) How many sandwiches were there for each boy?

(*b*) How many cookies were there for each boy?

(*c*) How many eggs were there for each boy?

(*d*) How many apples were there for each boy?

10. At 3¢ each, what will 6 Christmas bells cost?

185. Practice with 2 and 3 in Multiplying and Dividing. (ORAL WORK.) Let one pupil give the answers to the examples under (*A*), another the answers to those under (*B*), and so on.

	(*A*)	(*B*)	(*C*)	(*D*)	(*E*)
1.	$5\times2=?$	$24\div3=?$	$3\overline{)18}$	$?\times7=21$	$12\div2=?$
2.	$12\div3=?$	$2\times?=16$	$9\times?=18$	$2\overline{)18}$	$6\times?=12$
3.	$4\times?=8$	$2\overline{)10}$	$21\div3=?$	$3\times?=3$	$3\overline{)21}$
4.	$3\overline{)27}$	3 into 9 = ?	$2\overline{)14}$	$15\div3=?$	$?\times3=18$
5.	$24=?\times3$	$2\times?=0$	$9\times?=27$	$2\overline{)8}$	$27\div3=?$

186. Rapid Drill. (CLASS WORK.) Study the examples below for five minutes and then give the answers. You should be able to do all these examples without making a mistake.

	(*A*)	(*B*)	(*C*)	(*D*)	(*E*)	(*F*)
1.	$9+3+6$	$10-6$	$44+6$	$15-7$	$6+5+9$	$13-4$
2.	$11-6$	$6\times4+3$	$12-7$	$7+4+7$	$13-9$	$9\times4+7$
3.	$16-9$	$26+7$	40×5	$13-6$	$46+27$	$13-7$
4.	40×8	$62-28$	$37+4$	$84-49$	$25-6$	$56+29$

THE INCH, THE FOOT, AND THE YARD

187. The Foot Rule. (Silent Study.) Get ready to answer the questions below.

1. Who is the tallest child in the room?
2. Who is the shortest child in the room?
3. Name a child who is taller than you are.
4. Name a child who is shorter than you are.

(*A*) ———————————

(*B*) ———————————————————

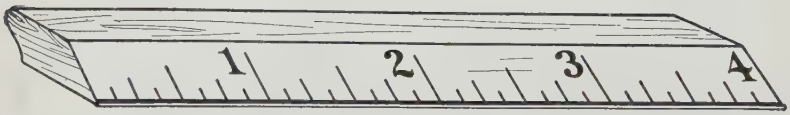
5. Is line (*A*) shorter or longer than line (*B*)?

(*C*)	(*D*)	(*E*)

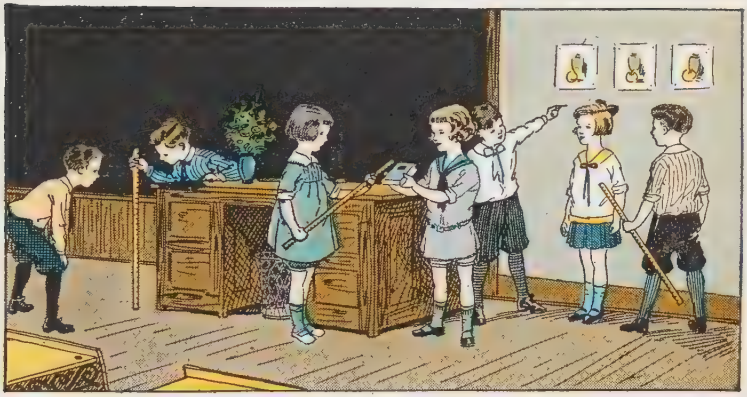
6. Is (*C*) longer than (*D*)? 7. Is (*E*) shorter than (*D*)?

If we look at different things, we can sometimes tell which is longer or shorter or taller, but if we wish to know just how long or wide or high something is we must **measure** it. A **ruler, 12 inches,** or **1 foot,** long is used for measuring things that are not very long.

8. Have you a ruler that is marked like the part of one in the picture below?



9. How many numbers does your ruler have on it?



10. Does your ruler measure this far between numbers? ——— 1 inch

11. Is your ruler 12 inches long?

12. How many inches long is the ruler under question 8?

A ruler 12 inches long is a "foot" ruler. 12 inches = 1 foot.

188. Measuring. (Class Work.) Can you measure with a ruler as the children in the picture at the top of the page are doing? Using your ruler, find the answers to the questions.

1. How many inches long is your arithmetic book?
2. How many inches wide is it?
3. Is your desk wider than a foot?
4. How many inches wider than a foot is your desk?

5. How tall is the tallest boy in the room?

6. How tall is the shortest girl in the room?

7. How wide is one of the windows in the room?

8. Measure other things in the room and tell how long or wide or high they are.

9. Choose a pupil to go to the blackboard and with the use of a ruler draw a line 1 foot long.

10. Now choose another pupil and ask him to take a ruler and make the line four inches longer.

11. How many inches long should the line be now?

12. In sixteen inches there are one foot and how many inches?

189. Practice with Feet and Inches. (Written Work.) Copy and fill in the blanks.

1. 14 inches = ... foot ..... inches.
2. 16 inches = ... foot ..... inches.
3. 19 inches = ... foot ..... inches.
4. One foot and five inches = ... inches.
5. One foot and ten inches = ... inches.
6. 12 inches plus 3 inches = ... foot ..... inches.
7. One foot less 3 inches = ... inches.
8. 9 inches plus 6 inches = ... foot ..... inches.
9. 8 inches plus 8 inches = ... foot ..... inches.
10. One foot two inches less 3 inches = ... inches.

190. The Yard. (CLASS WORK.) These boys are marking off a school garden. The lengths are so long that it would be very slow work for them if they used a foot rule. They are using a **yardstick.** The lines they are marking are 5 yards apart. Measure a **yardstick** with a **foot rule.**

1. How many feet are in a yard?

You know that there are 12 inches **in a foot.** You have found that there are 3 feet in a yard.

Show by adding the numbers below how many inches there are in a yard.

12 inches = 1 foot
12 inches = 1 foot
12 inches = 1 foot

2. What number belongs where the question mark is? ? inches = 3 feet or 1 yard.

Study what you see at the right until you can say it without looking at your book.

12 inches = 1 foot
3 feet = 1 yard
36 inches = 1 yard

3. Using a yardstick, measure the length or height of a window in your schoolroom.

Tell what numbers belong on the blanks:

4. 5 feet = ... yard and ..... feet.

5. 4 feet = ... yard and ..... foot.

6. 38 inches = ... yard and ..... inches.

7. 45 inches = ... yard and ..... inches.

Sometimes we write the words for these measures in a short form, as shown in the box below.

"in." is a short way of writing inch, or inches.
"ft." is a short way of writing foot, or feet.
"yd." is a short way of writing yard, or yards.

191. Comparison of Measurements. (WRITTEN WORK.) Tom, Joe, Mary, and Alice were brothers and sisters. One day their father asked each of the children to stand against the garage door so that he could measure them.

He wanted to keep a record to see which one would grow the most in six months or a year. At the top of the next page is a picture of the door and the marks which he made for each child.

Write the numbers from 1 to 9 in a column, and

write after them the answers to the 9 questions below. Then do what is suggested in numbers 10 to 12.

1. Was Mary taller than Tom?
2. Which child was the shortest?
3. Which child was shorter than a yard?
4. Which child was the tallest of the four?
5. How much taller than a yard was Alice?
6. How much shorter than Tom was Mary?
7. How much taller than Joe was Tom?
8. What was the difference in the heights of Mary and Alice?
9. How much taller than 3 feet was Joe?
10. Cut a piece of string as long as Joe's height.
11. Cut a piece of string as long as Tom's height.
12. Lay the strings side by side with the left ends even. Then measure the difference in their lengths and tell how much longer one is than the other.

192. Estimating Answers. (CLASS WORK.) Studying this lesson should help you to get the correct answers to problems that you will later wish to work. Read each problem and answer the questions. After you have answered the questions, work the problem to see if your answers are correct.

1. Alice bought a dozen eggs for 24 cents. She gave the clerk a half dollar (50¢). How much change should she have received?

(*a*) How many quarters in a half dollar?
(*b*) Is 24 cents more or less than a quarter?
(*c*) Will the answer be more or less than a quarter?
(*d*) What is the answer?

Read the next problem and tell whether the answer will be more or less than a quarter.

2. How much change should Joe receive from a half dollar after paying for a ball that cost 30 cents?

3. Clara bought a doll which cost 56 cents. Will the change she should get from a dollar be almost a quarter or almost a half-dollar? Why?

4. Joe had 35 cents. Will he have a dollar after he earns 50 cents pulling weeds in the garden?

HINTS: (*a*) Think 50 cents and 50 cents are a dollar.
(*b*) Is 35 cents as much as 50 cents?
(*c*) Will 35 cents and 50 cents make a dollar?

5. Mrs. Lane needed 2 yd. of ribbon for Ann's dress. She had one piece 34 in. long and another, 30 in. long.

(*a*) How many inches are in one yard?
(*b*) Did she have 2 yards in both pieces?

PROBLEM SCALE NO. 6

193. Problems about Home and School. (WRITTEN WORK.) If you work every problem correctly, you will earn 35 points. Work the problems; then look at the Standards, and find how well you have done.

Read each problem carefully, but before you work it, try to estimate, or guess, what a reasonable answer to the problem is. Then after you work it, see how close your answer is to what you thought it should be.

1. June's mother needed 8 eggs for cooking. She had only 2 eggs; so she asked June to tell her how many more eggs were needed. June gave the correct answer. What was it? (3)

2. In William's school there are 25 children in the first grade, 31 children in the second grade, and 24 children in the third grade. How many children are there in the first three grades in this school? (3)

3. Mary had 3 cents. She wanted to buy an ice-cream cone which cost 5 cents. How much more money did Mary need? (4)

4. John was playing in the yard with Scott and Fred. His mother called him to get some cookies. "I want you to take three cookies to each of your friends and have three for yourself," she said. How many cookies in all did John's mother have to give him? (4)

5. A class of 27 pupils divided itself into three equal groups for a spelling game. How many children were there in each group? (5)

6. Harry worked 8 problems correctly on Monday, 7 on Tuesday, 8 on Wednesday, 10 on Thursday, and 9 on Friday. How many problems did Harry work correctly on these five days? (5)

7. A third grade planned a party. There were to be 34 people at the party. How many cookies were needed if each person was to have 3? (5)

8. Florence bought a box of crackers for 8 cents, a loaf of bread for 10 cents, and a pound of butter for 50 cents. How much did these groceries cost? (6)

STANDARDS

Superior work:	26–35 points	Slow work:	6–12 points
Good work:	19–25 points	Inferior work:	0– 5 points
Average work:	13–18 points		

DIVIDING BY FOUR

194. Using 4 in Division. (Class Work.) Would you like to practice a little with 4 in multiplication before you try to use it in division? It will be a good review, and it will help you to learn the division facts that use 4. See how quickly you can give the missing numbers in the following examples.

	(*A*)	(*B*)	(*C*)	(*D*)
1.	$4\times1=?$	$4\times?=36$	$?\times1=4$	$4\times?=32$
2.	$4\times?=12$	$16=4\times?$	$8\times4=?$	$9\times4=?$
3.	$20=4\times?$	$6\times4=?$	$4\times?=20$	$28=4\times?$
4.	$?\times4=28$	$32=?\times4$	$0\times4=?$	$36=4\times?$
5.	$4\times?=16$	$?\times3=12$	$4\times7=?$	$4\times?=24$

Work these problems:

6. A girl bought 4 packages of chewing gum at 5¢ a package. How much did the gum cost her?

7. There were 5 sticks of gum in each package. How many sticks of gum did she buy?

8. She divided the sticks of gum equally among 3 other girls and herself. How many sticks did each get?

Give the answers:

	(*A*)	(*B*)	(*C*)	(*D*)
9.	$8 \div 4 = ?$	$4\overline{)32}$	$24 \div 4 = ?$	$4\overline{)4}$
10.	36 divided by 4	$4\overline{)16}$	$28 \div 4 = ?$	$20 \div 4 = ?$
11.	12 divided by 4	$4 \div 4 = ?$	$4\overline{)20}$	$4\overline{)28}$

195. Review of Division Facts Using 2, 3, and 4. (Oral Practice.) Practice saying the answers in these examples until you can give them as fast and as easily as you can say your name.

EXERCISE

	(*A*)	(*B*)	(*C*)	(*D*)
1.	$2\overline{)2}$	$2\overline{)6}$	$3\overline{)9}$	$4\overline{)28}$
2.	$3\overline{)12}$	$4\overline{)8}$	$2\overline{)10}$	$3\overline{)21}$
3.	$2\overline{)8}$	$3\overline{)3}$	$4\overline{)20}$	$4\overline{)36}$
4.	$4\overline{)12}$	$4\overline{)16}$	$3\overline{)18}$	$3\overline{)24}$
5.	$4\overline{)4}$	$2\overline{)12}$	$2\overline{)14}$	$4\overline{)32}$
6.	$3\overline{)6}$	$3\overline{)15}$	$4\overline{)24}$	$3\overline{)27}$
7.	$2\overline{)4}$	$2\overline{)18}$	$2\overline{)16}$	

SELF-TESTING DRILL NO. 11

196. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. Find your score and make your record on the Score Card. **Try to beat all your past records.**

1.	2.	3.	4.	5.
169	$16 \div 2 =$	8	36	*Multiply:*
250		9	108	35 by 9
271		90	44	
182		587		

6.	7.	8.	9.	10.
$32 \div 4 =$	$28 \div ? = 7$	585	$6 \times ? = 30$	*Multiply:*
		-496		145 by 5

11. 305 minus 179 = ?

12. 912 minus 406 = ?

13. A storekeeper divided 24 watermelons into 4 equal piles. How many watermelons were there in each pile?

14. He sold 10 of the melons. How many did he have left?

15. Add 89 and 54; then subtract 24 from the sum.

STANDARDS

Number correct..	0	1–4	5	6	7	8	9	10	11	12–14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

Are you missing the multiplication facts? If so, use the cards you made for home practice (see page 226), or study Articles 292 and 293.

EASY FRACTIONS

197. The Meaning of $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$. (SILENT READING.) Here are pictures of three apples. Get ready to give the answers to the questions below the pictures.

(*A*) (*B*) (*C*)

1. Which apple is divided into 2 equal parts?
2. Which apple is divided into 3 equal parts?
3. Which apple is divided into 4 equal parts?
4. Is a piece of apple (*A*) larger than a piece of apple (*C*)?
5. Is a piece of apple (*B*) larger than a piece of apple (*C*)?

One piece of apple (*A*) is one-half of it. One-half is written $\frac{1}{2}$

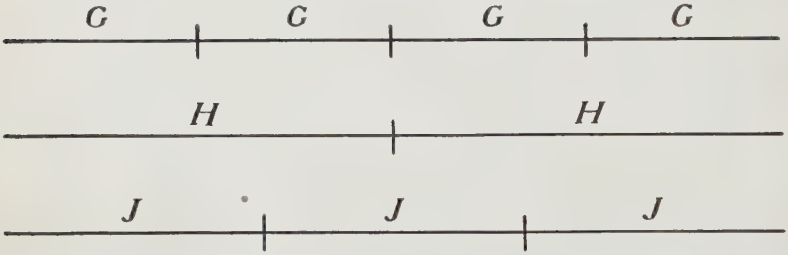
One piece of apple (*B*) is one-third of it. One-third is written $\frac{1}{3}$.

One piece of apple (*C*) is one-fourth of it. One-fourth is written $\frac{1}{4}$.

Answer the questions below the picture:

6. Which circle is divided into fourths?

7. Which circle is divided into halves? Into thirds?



8. Which letter shows $\frac{1}{2}$ of the line?

9. Which letter shows $\frac{1}{3}$ of the line? $\frac{1}{4}$ of the line?

10. How many halves are there in a whole apple, or circle, or line, or pie?

11. How many halves are there in 1?

12. How many thirds are there in a whole apple, or line, or stick of candy?

13. How many thirds are there in 1?

14. If you cut a string into four equal parts, what would one part be called?

15. How many fourths are there in 1?

16. Does $\frac{1}{2}$ a line equal the other $\frac{1}{2}$ of the same line?

198. The Use of Halves, Thirds, and Fourths. (WRITTEN WORK.) Write the numbers from 1 to 10 in a column near the left edge of your paper. After the numbers write the answers to the questions.

Hints: We write one-third this way: $\frac{1}{3}$.
We write two-thirds this way: $\frac{2}{3}$.
We write three-fourths this way: $\frac{3}{4}$.

1. What part of the circle is black?
2. What part of the first square is black?
3. How much of the second square is black?
4. How much of the pie is left in the pan?
5. What part of the glass is filled?

6. How much of the circle at the left is black?
7. What part of the window is broken?
8. How much of the next circle is missing?
9. What part is needed to complete the last circle?
10. Is $\frac{1}{3}$ larger or smaller than $\frac{1}{2}$?

199. Finding $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ of a Number. (Class Work.) Here is another chance to use what you know in getting answers to new questions. You know that if you wish to give $\frac{1}{2}$ of 1 apple to a friend, you must cut it into two equal parts. You also know that if you have two sticks of candy and divide them equally with your brother, each of you will have one stick.

2 divided by $2 = 1$. Do you see that $\frac{1}{2}$ of $2 = 1$?

1. Helen had four pieces of candy. She gave her sister $\frac{1}{2}$ of them. How many pieces did she give her sister?

2. If you divide 4 things into 2 equal groups, how many should you put into each group? $4 \div 2 = ?$

Look at the picture of the four pears just below.

Hints

(*a*) You have already learned that $4 \div 2 = 2$.

(*b*) Do you see that $4 \div 2$ means the same as $\frac{1}{2}$ of 4?

(*A*) $4 \div 2 = 2$

$\frac{1}{2}$ of $4 = 2$ $\frac{1}{2}$ of $4 = 2$

To find $\frac{1}{2}$ of a number divide it by 2

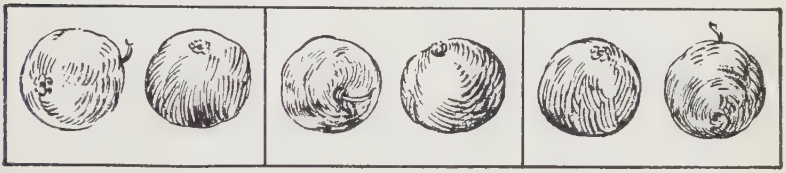
3. $\frac{1}{2}$ of 6 is the same as $6 \div 2$. What is the answer?

Give the answers to Examples 4 to 8 below:

4.	5.	6.	7.	8.
$5+5=$	$6+6=$	$7+7=$	$8+8=$	$9+9=$
$\frac{1}{2}$ of $10=$	$\frac{1}{2}$ of $12=$	$\frac{1}{2}$ of $14=$	$\frac{1}{2}$ of $16=$	$\frac{1}{2}$ of $18=$

Look at the picture of the six apples just below.

(*B*) $6 \div 3 = 2$



$\frac{1}{3}$ of $6=2$ $\frac{1}{3}$ of $6=2$ $\frac{1}{3}$ of $6=2$

HINTS: (*a*) Here are 6 apples divided into 3 equal groups.
(*b*) You know that $6 \div 3 = 2$.
(*c*) Do you see that $\frac{1}{3}$ of 6 means $6 \div 3$?

To find $\frac{1}{3}$ of a number divide it by 3.

Give the answers to Examples 9 to 15 below:

9.	10.	11.	12.
$3+3+3=$	$4+4+4=$	$\frac{1}{3}$ of $18=$	$\frac{1}{3}$ of $27=$
$\frac{1}{3}$ of $9=$	$\frac{1}{3}$ of $12=$	$\frac{1}{3}$ of $15=$	$\frac{1}{3}$ of $24=$

13. $\frac{1}{3}$ of $3=$ **14.** $\frac{1}{3}$ of $6=$ **15.** $\frac{1}{3}$ of $21=$

Now you know how to find $\frac{1}{2}$ and $\frac{1}{3}$ of a number. On page 262 you will learn to find $\frac{1}{4}$ of a number.

(*C*) $12 \div 4 = 3$

$\frac{1}{4}$ of $12 = 3$ $\frac{1}{4}$ of $12 = 3$ $\frac{1}{4}$ of $12 = 3$ $\frac{1}{4}$ of $12 = 3$

HINTS

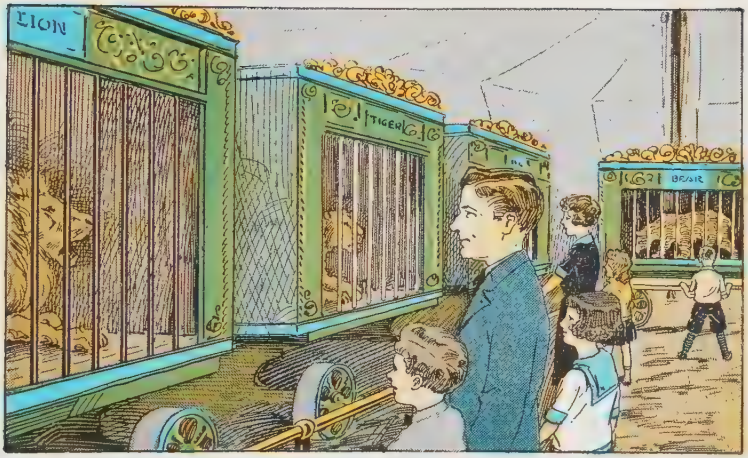
(*a*) How many sticks are there in the picture above?
(*b*) Into how many piles are they divided?
(*c*) You know that $12 \div 4 = 3$.
(*d*) $\frac{1}{4}$ of 12 means $12 \div 4$.

To find $\frac{1}{4}$ of a number divide it by 4.

16.	17.	18.	19.
$2+2+2+2=$	$\frac{1}{4}$ of $4=$	$\frac{1}{4}$ of $16=$	$\frac{1}{4}$ of $20=$
$\frac{1}{4}$ of $8=$	$\frac{1}{4}$ of $24=$	$\frac{1}{4}$ of $28=$	$\frac{1}{4}$ of $32=$

200. Practice in Finding $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$. (WRITTEN WORK.) Write the answers to the following examples. Use what you know about division and multiplication.

1. $\frac{1}{3}$ of $3=?$	8. $\frac{1}{4}$ of $4=?$	15. $\frac{1}{3}$ of $24=?$
2. $\frac{1}{4}$ of $8=?$	9. $\frac{1}{3}$ of $21=?$	16. $\frac{1}{4}$ of $16=?$
3. $\frac{1}{2}$ of 6 inches $=?$	10. $\frac{1}{2}$ of $4=?$	17. $\frac{1}{4}$ of $24=?$
4. $\frac{1}{4}$ of $20¢=?$	11. $\frac{1}{4}$ of $12=?$	18. $\frac{1}{3}$ of $18=?$
5. $\frac{1}{3}$ of $6=?$	12. $\frac{1}{4}$ of $32=?$	19. $\frac{1}{4}$ of $28=?$
6. $\frac{1}{2}$ of $2=?$	13. $\frac{1}{2}$ of $16=?$	20. $\frac{1}{3}$ of $27=?$
7. $\frac{1}{3}$ of $15¢=?$	14. $\frac{1}{2}$ ft. = how many inches?	21. $\frac{1}{4}$ of $36=?$



PROBLEM SCALE NO. 7

201. Problems about Fun in a Small Town. (WRITTEN WORK.) If you work every problem correctly, you will earn 50 points. Work the problems; then look at the Standards at the end of the article, and find out what kind of problem work you are doing.

1. John went to a circus. He counted 2 lions, 1 bear, 3 elephants, 11 dogs, and 8 ponies. How many animals did he count in all? (3)

2. There are two merry-go-rounds in the park at Pine Glen. Eight children at a time can ride on each merry-go-round. How many children can ride on both the merry-go-rounds at a time? (4)

3. In the park there are six teeters. How many children can play on these if two children can play on each teeter? (4)

4. If four children played on each teeter, how many children played on all six teeters? (5)

5. Two children can sit on each end of a teeter. When they do this, how many are on six teeters? (5)

6. The circus came to a town where 829 people lived. Only 372 people from this town went to the circus. How many of the people in this town did not go to the circus? (5)

7. In this town there were 23 children of the third grade who belonged to the Bluebird Club, and 38 children in the fourth and fifth grades together who were Bluebirds. How many Bluebirds were there from all three grades? (5)

8. Frank didn't have any money to buy a ticket to the circus, so he carried water for some of the small animals at 3 cents for each pailful. He received 27 cents for this work. How many pailfuls did he carry? (6)

9. A circus ticket cost 25 cents. After Frank bought his ticket, how much money did he have left? (6)

10. Henry had saved 13 cents. His father gave him just enough more to buy a 25-cent ticket to the circus. How much money did Henry's father give him? (7)

STANDARDS

Superior work:	31–50 points	Slow work:	13–18 points
Good work:	26–30 points	Inferior work:	0–12 points
Average work:	19–25 points		

SELF-TESTING DRILL NO. 12

202. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. Find your score and make your record on the Score Card. **Try to beat all your past records.**

1.	2.	3.	4.	5.
$12 \div 3 =$	876	929	134	900
	-702	-201	$\times 7$	-501

6. 496
99
209
105

7. What number times 3 equals 27?

8. 145 times 3 = ?

9. *Subtract:*
601
492

10. 87
388
45
358

11. 107
489
63
87
86

12. 104
$\times 8$

13. $\frac{1}{3}$ of 15 = ?

14. $169+373+337+77=?$

15. *Write in figures and subtract:*
(*a*) Two hundred seventy-one.
(*b*) Two hundred sixty-eight.

STANDARDS

Number correct..	0	1–3	4–5	6–7	8	9	10	11	12	13–14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

Did you miss any of the addition examples? If you did, practice Articles 288 and 289; also Articles 47, 50, and 52.

DIVIDING BY FIVE

203. Using 5 in Division. (CLASS WORK.) Practice using 5 in multiplication before you try to use it in division. Reviewing what you have learned always helps you to learn new things, doesn't it? Give the missing numbers quickly.

EXERCISE

	(A)	(B)	(C)	(D)
1.	$5\times3=?$	$?\times5=5$	$5\times0=?$	$5\times?=35$
2.	$?\times5=25$	$35=5\times?$	$45=5\times?$	$45=?\times5$
3.	$5\times?=10$	$9\times5=?$	$7\times5=?$	$20=5\times?$
4.	$30=?\times5$	$?\times5=40$	$5\times?=30$	$6\times5=?$
5.	$4\times5=?$	$5\times6=?$	$?\times1=5$	$40=5\times?$

Work these problems:

6. How many cents make 6 nickels?
7. At 5¢ each, how much will 8 oranges cost?
8. How many nickels make 45 cents?
9. How many 5's make 20?

Give the answers:

	(A)	(B)	(C)	(D)
10.	$15\div5=?$	$35\div5=?$	$5\overline{)25}$	$5\overline{)40}$
11.	$5\overline{)5}$	$5\overline{)10}$	$45\div5=?$	$35\div5=?$
12.	$20\div5=?$	$40\div5=?$	$\frac{1}{5}$ of $10=?$	$5\overline{)20}$
13.	$\frac{1}{5}$ of $15=?$	$\frac{1}{5}$ of $25=?$	$30\div5=?$	$\frac{1}{5}$ of $45=?$
14.	$\frac{1}{5}$ of $5=?$	$\frac{1}{5}$ of $30=?$	$\frac{1}{5}$ of $35=?$	$\frac{1}{5}$ of $20=?$

204. Review of Division Facts and Fractions Using 2, 3, 4, and 5. (ORAL PRACTICE.) Practice on the examples on this page and the next until you can give the answers to them all without a mistake. See how quickly you can give each answer.

EXERCISE

	(*A*)	(*B*)	(*C*)	(*D*)
1.	$4 \div 2$	$\frac{1}{2}$ of 10	$4\overline{)4}$	$8 \div 4$
2.	$\frac{1}{2}$ of 6	$18 \div 2$	$10 \div 5$	$\frac{1}{5}$ of 15
3.	$2\overline{)2}$	$\frac{1}{3}$ of 15	$\frac{1}{4}$ of 8	$5 \div 5$
4.	$\frac{1}{3}$ of 9	$12 \div 2$	$\frac{1}{5}$ of 5	$\frac{1}{4}$ of 16

	(*E*)	(*F*)	(*G*)	(*H*)
5.	$6 \div 2$	$\frac{1}{2}$ of 12	$\frac{1}{4}$ of 4	$\frac{1}{4}$ of 12
6.	$3\overline{)15}$	$14 \div 2$	$4\overline{)12}$	$20 \div 4$
7.	$\frac{1}{3}$ of 3	$\frac{1}{3}$ of 18	$15 \div 5$	$\frac{1}{5}$ of 25
8.	$\frac{1}{2}$ of 4	$21 \div 3$	$\frac{1}{5}$ of 10	$4\overline{)16}$

	(*I*)	(*J*)	(*K*)	(*L*)
9.	$\frac{1}{2}$ of 2	$2\overline{)16}$	$20 \div 5$	$\frac{1}{5}$ of 40
10.	$6 \div 3$	$\frac{1}{2}$ of 14	$\frac{1}{4}$ of 24	$4\overline{)24}$
11.	$2\overline{)8}$	$\frac{1}{3}$ of 27	$5\overline{)25}$	$\frac{1}{4}$ of 20
12.	$\frac{1}{3}$ of 6	$3\overline{)24}$	$\frac{1}{5}$ of 30	$35 \div 5$
13.	$3 \div 3$	$\frac{1}{2}$ of 16	$\frac{1}{4}$ of 28	$30 \div 5$

	(*M*)	(*N*)	(*O*)	(*P*)
14.	$\frac{1}{2}$ of 8	$\frac{1}{3}$ of 24	$\frac{1}{5}$ of 35	$5\overline{)45}$
15.	$9 \div 3$	$3\overline{)27}$	$32 \div 4$	$28 \div 4$
16.	$3\overline{)12}$	$\frac{1}{2}$ of 18	$\frac{1}{4}$ of 36	$4\overline{)36}$
17.	$10 \div 2$	$\frac{1}{3}$ of 21	$4\overline{)28}$	$\frac{1}{5}$ of 45
18.	$\frac{1}{3}$ of 12	$3\overline{)18}$	$\frac{1}{5}$ of 20	$\frac{1}{4}$ of 32

205. Problems. (Written Work.) Find the answers to these nine problems. Be sure to do neat work on your paper.

1. If you divided 21¢ equally among 3 boys, how much money would each boy get?

2. How much will 6 four-cent stamps cost?

3. How many inches are there in $\frac{1}{4}$ ft.?

4. A girl had a quarter and spent $\frac{1}{5}$ of it. How much did she spend?

5. 9 yd. equal how many ft.?

6. How many two-cent stamps can you get for 18 cents?

7. A boy sold 6 newspapers at 3¢ each. How much did he receive for the 6 newspapers?

8. The boy gave half of what he received for the 6 newspapers to his little brother. How many cents did he give to his little brother?

9. How many 5¢ toys can you buy for 35¢?

206. Rapid Drill. (CLASS WORK.) Some examples in this article are harder than ones in the drills you have had before. Try to find the answer to each one without using your pencil. Study all of the examples and be ready to give the answers.

	(A)	(B)	(C)	(D)	(E)
1.	13+7+7	14−9	7×.... =14	7+8+9	16−7
2.	17−8	8+9+3	13−4	4×8+3	47+5+8
3.	64+6	14−5	15+8+9	16−9	6×4+5
4.	15−7	18+5+8	9×.... =36	10+4+5	11−3
5.	15+7+6	17−9	18+8+6	20×3	29+5
6.	13−7	28+7+5	9×10	36+5+9	15−6
7.	5+16+7	14−6	6+4+10	9−0	9×0
8.	15−9	9+4+4	13−9	4×.... =24	14+10
9.	20+20	11−4	7×4+6	13+20	13−5
10.	13−8	16+4+10	12−3	5×9+4	28+4+10
11.	11−9	4×.... =36	13+5+3	2×.... =18	14−8
12.	3+3+13	30×2	28−9	22−7	8+2+10
13.	50×4	22−5	29+2+10	31−6	26−8
14.	26+2+10	41−7	7+2+7	40×9	19+1+20

SELF-TESTING DRILL NO. 13

207. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. Find your score and make your record on the Score Card. **Try to beat all your past records.**

1.	2.	3.	4.	5.
91	40	435	108	811
520	×7	38	97	−155
6		339	688	
99		156	78	

6.	7.	8.	9. Multiply 124 by 8.
58	103	635	
257	×9	−398	10. 98
579			×4
4	11.	12.	
	$ 8.11	751	
	−3.78	−572	13. 902 minus 484 = ?

14. Two third-grade girls together weighed 147 pounds. One of them weighed 62 pounds. How much did the other girl weigh?

15. Subtract five hundred two from five hundred ten.

STANDARDS

Number correct..	0	1–2	3	4–5	6	7	8–9	10	11	12–14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

If you missed subtraction examples, practice Articles 290 and 291.

SUMMARY

208. General Review. (WRITTEN WORK.) Try hard to get the correct answer for every one of the next 27 problems and examples.

1. Write in a column and add: \$3.96; 7¢; and \$8.37.

2. Show how to work the example at the right a quicker way than by adding.

52
52
52
156

3. (*a*) $\frac{1}{2}$ of 16 = (*c*) $\frac{1}{5}$ of 10 =
(*b*) $\frac{1}{3}$ of 18 = (*d*) $\frac{1}{4}$ of 20 =

4. Write two signs that mean divide.

5. Fifteen inches equal ..... ft. ..... in.

6. 6 is the answer when 18 is ..... by 3.

7. When an apple is cut into three equal parts, one of the parts is called one ..... of the apple.

8. $\frac{1}{4}$ of 28 =

9. $9 \times 0 =$

10. Find the difference of 628 and 493.

11. Show how $2\overline{)8}$ can be written another way.

12. A yard equals ..... inches.

13. $445 + 5 =$ 14. $\frac{1}{3}$ of 27 = 15. $7 \times \ldots + 7 = 35$

16. Two feet equal ..... inches.

17. Does $\frac{1}{3}$ of 9 equal $3\overline{)9}$?

18. Subtract sixty-three cents from two dollars and ninety cents.

19. Multiply one hundred eighty-nine by 3.

20. Which is longer, 53 inches or 1 yd. and 13 in.?

21. Which is larger, $\frac{1}{2}$ or $\frac{1}{3}$ of an orange?

22. Check the answer to the subtraction example at the right. If it is wrong, give the correct answer.

$$\begin{array}{r} 417 \\ -128 \\ \hline 389 \end{array}$$

Look at Examples (*A*), (*B*), and (*C*) and then copy Questions 23 to 25 below and fill in the blanks.

(*A*)	(*B*)	(*C*)
286	131	491
$\times 3$	46	-186
	396	
	407	

23. Example ..... will have a difference for the answer.

24. Example ..... will have a product for an answer.

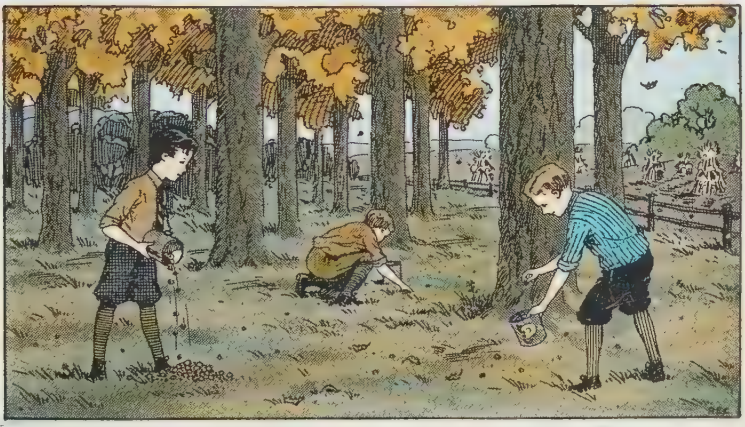
25. Example ..... will have a sum for the answer.

26. Is 6 one-half, one-third, or one-fourth of 18?

27. $\frac{1}{2}$ of $2 = ?$

CHAPTER IX

SHORT DIVISION WITH CARRYING. LARGER NUMBERS. LIQUID MEASURE. POUNDS AND OUNCES. THE DOZEN



EASY SHORT DIVISION

209. Easy Short Division with Larger Numbers. (CLASS WORK.) In this article you will find many ways to use things that you have already learned.

1. These three boys counted the walnuts as they put them in the pile. When they had picked up all the nuts, they added and found that there were 369 nuts in the pile.

They wanted to divide them equally. They had

learned how to divide large numbers. This is the way they found out how many each boy should have:

$$3\overline{)369}\quad 123$$

(*a*) Think "3 into 3 goes 1 time." Write the 1 above the 3.

(*b*) Think "3 into 6 goes 2 times." Write the 2 above the 6.

(*c*) Think "3 into 9 goes 3 times." Write the 3 above the 9.

Answer: 123 nuts. Each boy should get 123 nuts.

Give the answers to these examples:

2.	**3.**	**4.**	**5.**	**6.**	**7.**
$2\overline{)48}$	$3\overline{)36}$	$4\overline{)84}$	$5\overline{)55}$	$2\overline{)68}$	$3\overline{)93}$

Example 8 is a little different from those above.

8.

$$2\overline{)126}\quad 63$$

(*a*) Think "2 into **12** goes 6 times." Write the 6 over the **2**.

(*b*) Think "2 into 6 goes 3 times." Write the 3 over the 6.

Give the answers:

9.	**10.**	**11.**	**12.**	**13.**	**14.**
$3\overline{)153}$	$2\overline{)148}$	$4\overline{)248}$	$5\overline{)255}$	$3\overline{)219}$	$4\overline{)168}$

The answer in division is called the "quotient."

In $2\overline{)48}$, 24 is the **quotient,** or answer. It means that there are twenty-four 2's in 48.

SOMETHING A GOOD WORKER WILL WANT TO KNOW

$$\begin{array}{r} 134 \\ 2\overline{)268} \end{array}$$

(*a*) Do you see that 268 equals $\begin{cases} 200 \\ 60 \\ 8 \end{cases}$

(*b*) Dividing 268 by 2, the quotient, or answer, is 134.

(*c*) In getting 134 for the quotient this is what happened: ➙

$$\begin{array}{r} 200 \div 2 = 100 \\ 60 \div 2 = 30 \\ 8 \div 2 = 4 \\ \hline 268 \div 2 = 134 \end{array}$$

READING AND WRITING LARGER NUMBERS

210. Numbers to 10,000. (Class Work.) Look at the column of numbers below and answer the questions.

1000 ←
1000
1000
1000
1000
1000
1000
1000
1000
1000
10,000

1. What is the number with the arrow pointing at it?

2. Count by hundreds to 1000.

3. Is the column at the left added correctly?

4. Count by thousands to ten thousand. (Start by saying "1 thousand, 2 thousand," and so on.)

5. How many thousand are there in 10,000?

2000 is read: **two thousand**
4000 is read: **four thousand**
9000 is read: **nine thousand**

6. Read this number ⟶ 1000

7. Read this number ⟶ 800

The sum of these numbers is ⟶ 1800

The number 1800 is read **one thousand eight hundred,** or **eighteen hundred.**

The number 2300 is read **two thousand three hundred** or **twenty-three hundred.**

Answer Questions 8 and 9 below these columns:

	1000						
	1000				10		
	1000				10		1
	1000		100		10		1
	1000		100		10		1
	1000		100		10		1
6354 =	6000	+	300	+	50	+	4

This number is read **six thousand three hundred fifty-four** or **sixty-three hundred fifty-four.**

8. How many thousand are there in 6354?

9. How many hundreds are there in 6354? How many tens? How many ones?

Read these numbers:

	(*A*)	(*B*)	(*C*)	(*D*)	(*E*)	(*F*)
1.	1010	2222	3030	4082	5000	8090
2.	1200	2402	3409	4445	5111	9001
3.	1205	2600	3900	4800	5555	9999
4.	2000	3003	4000	4999	6492	10,000

Tell the numbers and words that belong on the blanks below. Number 5 shows how to do it.

			1	*7*	*2*	*3*
5.	1723	equals	*thousands*	*hundreds*	*tens*	*ones*
6.	4040	equals	.....	.....	.....	.....
7.	7407	equals	.....	.....	.....	.....
8.	3009	equals	.....	.....	.....	.....
9.	5050	equals	.....	.....	.....	.....

211. Writing Larger Numbers. (WRITTEN WORK.) Put the numbers 1 to 15 on your paper and write after them in figures the large numbers asked for below.

1. 6 thousands, 2 hundreds, 8 tens, and 5 ones.

2. 3 thousands, no hundreds, 3 tens, and no ones.

3. 7 thousands, 9 hundreds, no tens, and 1 one.

4. 8 thousands, no hundreds, no tens, and no ones.

5. 4 thousands, no hundreds, 6 tens, and 4 ones.

6. 9 thousands, 9 hundreds, no tens, and no ones.

7. One thousand seven hundred sixty-four.

8. Three thousand six. **9.** Eight thousand.

10. Seven thousand nine hundred nine.

11. Four thousand four hundred forty-six.

12. Five thousand three hundred sixteen.

13. Twenty-six hundred.

14. Fifty-five hundred fifty-five.

15. Eighty-nine hundred forty.

CHECKING DIVISION

212. How to Check Division. (CLASS WORK.) Do you remember how to check addition and subtraction examples, and to prove multiplication examples so that you may be quite sure the answers are correct? There is a way to check division examples, too. This is how to do it:

Examples	*Checks*
(*A*) $2\overline{)8}$ quotient 4	Multiply 4 by 2. $4 \times 2 = 8$ The answer (quotient) is correct.
(*B*) $4\overline{)12}$ quotient 3	$3 \times 4 = 12$ Quotient, 3, is correct.
(*C*) $2\overline{)66}$ quotient 33	$33 \times 2 = 33$ $\times 2$ 66 Quotient, 33, is correct.
(*D*) $4\overline{)848}$ quotient 212	*Check by multiplying:* 212 $\times 4$ 848 Quotient, 212, is correct.

To check division, multiply the quotient by the number you divided by. If this product is the same as the number you divided, your quotient is probably correct.

In the following examples, tell how you would check the quotients (answers). You would explain the first one this way: "Multiply 213 by 3."

1.	2.	3.	4.	5.	6.
213	314	123	112	111	113
$3\overline{)639}$	$2\overline{)628}$	$2\overline{)246}$	$4\overline{)448}$	$5\overline{)555}$	$3\overline{)339}$

What does the check show in the example below?

The Work	*Check*
	132
132	$\times 3$
$3\overline{)369}$ ⟷	396

Which example below is **not** correctly worked?

7.	*Check*
211	211
$4\overline{)844}$	$\times 4$
	844

8.	*Check*
312	312
$3\overline{)936}$	$\times 3$
	936

9.	*Check*
232	232
$2\overline{)486}$	$\times 2$
	464

213. Practice in Dividing and Checking. (WRITTEN WORK.) Find the quotients for the following examples. Check your work.

EXERCISE

1.	2.	3.	4.	5.	6.
$3\overline{)159}$	$2\overline{)186}$	$4\overline{)124}$	$3\overline{)189}$	$5\overline{)355}$	$4\overline{)288}$
7.	**8.**	**9.**	**10.**	**11.**	**12.**
$2\overline{)162}$	$3\overline{)246}$	$4\overline{)324}$	$5\overline{)455}$	$4\overline{)368}$	$3\overline{)279}$

LIQUID MEASURE

214. Pints, Quarts, and Gallons. (Class-Work.) These third-grade children have all been weighed. Some of them do not weigh as much as they should. They have been talking about what they should do to become strong.

How much milk does the healthy boy in the "Good Health" poster say he drinks in one day? The tall boy looking at the poster is Bob King. He wants to weigh more than he does so that he can take hikes with the other boys and play football.

He is thinking "How many glasses of milk are in a quart of milk?" Do you know the answer to Bob's question? You can find out by following the directions given below.

1. Do you have a pint, a quart, and a gallon measure in your school? If not, some children in the class can bring them from home. Also get a glass.

2. Fill the pint measure with water. Then pour the water into the glass. How many times will the pint of water fill the glass? How many glassfuls are there in one pint?

1 PINT

One pint equals how many glassfuls?

GLASS

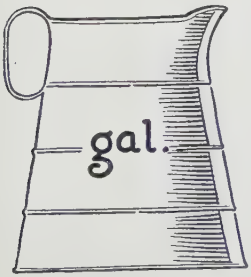
3. Fill the pint measure and pour the water into the quart measure. How many pints does it take to make a quart?

1 QUART

One quart equals how many pints?

1 PINT

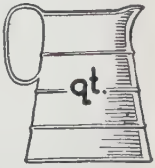
4. How many glassfuls of milk did the healthy boy drink each day?



1 GALLON

5. Fill the quart measure and pour the water into the gallon measure. Do this until the gallon measure is full. How many quarts does it take to make a gallon?

One gallon equals how many quarts?



1 QUART

We call pints, quarts, and gallons "liquid measures" because they are used in measuring things like milk, water, and oil. Learn the table of Liquid Measure below.

Liquid Measure

2 glassfuls (or cupfuls) = 1 pint
2 pints = 1 quart
4 quarts = 1 gallon

This is a short way to write these words:

pint, or pints — **pt.**

quart, or quarts — **qt.**

gallon, or gallons — **gal.**

215. Practice with Liquid Measure. (WRITTEN WORK.) Write the numbers 1 to 7 on your paper, and after them write the answers to the questions below.

1. Two glassfuls equal how many pints?

2. One quart equals how many pints?

3. A boy drank a glassful of milk for breakfast, one at noon, one after school, and another one for supper.

(*a*) How many pints of milk did he drink that day?

(*b*) How many quarts?

4. How many quarts are there in 2 gallons?

5. How many pints are there in 1 gallon?

6. How many quarts are there in 1 gal. and 2 qt.?

7. If milk costs 7¢ a pint, what will a quart cost?

DIVISION WITH ZERO

216. Dividing Zero. (SILENT READING.) By this time you know that you have to keep your eyes on the **zero** in arithmetic examples. If you add 3 and 0, the answer is 3. Zero subtracted from 3 leaves 3. If you multiply zero, or nothing by 3, the answer is zero. $3\times0=0$. $0\times3=0$.

Does this help you to know what the answer is when you divide zero, or nothing, by 3? It is the same as saying that you don't divide anything by 3 when you divide 0 by 3. Look at Examples 1, 2, and 3 below.

1. $2\overline{)20}$ — 10

(*a*) 2 goes into 2 once. Write the 1 over the 2.
(*b*) 2 goes into 0 no times. Write 0 over the 0.
10 is the correct quotient. $2\times10=20$.

2. $3\overline{)60}$ — 20

(*a*) 3 goes into 6 two times. Write 2 over the 6.
(*b*) 3 goes into 0 no times. Write 0 over the 0.
20 is the correct quotient. $3\times20=60$.

☛ Notice that zero doesn't always come at the end of a quotient. See the next example.

3. $4\overline{)804}$ — 201

(*a*) 4 goes into 8 two times. Write 2 over the 8.
(*b*) 4 goes into 0 no times. Write 0 over the 0.
(*c*) 4 goes into 4 one time. Write 1 over the 4.

Whenever you divide 0 by any number, put 0 in the quotient.

Think out the quotients for these examples:

4. $3\overline{)303}$ **5.** $4\overline{)120}$ **6.** $5\overline{)250}$ **7.** $2\overline{)600}$ **8.** $4\overline{)408}$ **9.** $3\overline{)270}$

SELF-TESTING DRILL NO. 14

217. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. **Try to beat all your past records.**

1.	2.	3.	4.	5.
145	336	29	$4\overline{)164}$	922
$\times 4$	68	48		-533
	327	507		
	346	407	7. 618	8. 720
6. $5\overline{)400}$			-260	-322

9. $5 \times 32 = ?$ 10. Divide 276 by 3. 11. $5\overline{)300}$

12. The committee in charge of a third-grade picnic bought ten pints of ice cream in pint bricks. How many quarts were there in the ten pints?

13. The druggist sold the ice-cream bricks to the pupils at his regular price per quart, which was 50 cents. How much did the ice cream cost?

14. The committee also bought two boxes of stick candy at 35¢ a box. How much did the candy cost?

15. There were 29 pupils and the teacher at the picnic. Each one gave 20¢ as his share of the expenses. The amount given was $6.00. The picnic cost $5.62. How much was left to put in the class treasury?

STANDARDS

Number correct..	0	1–3	4	5	6	7	8	9	10	11–14	15
Scores	0	1	2	3	4	5	6	7	8	9	10

PROBLEM STUDY

218. Hints on How to Work Problems. (SILENT READING.) Articles 69 and 115 gave you some help in working problems in addition and subtraction. You will need some help in working multiplication and division problems, too.

Here are some problems with numbers left out. Read and tell whether you would add, subtract, multiply, or divide to get the answer.

1. Joe had ..... dollars. James had ..... times as much money as Joe. How many dollars had James?

2. Four boys divided ..... apples equally. How many did each boy get?

3. The total cost of ..... books was ..... All the books were the same price. How much did each book cost?

4. Frank weighs ..... pounds. He should weigh ..... pounds. How many pounds must he gain to bring his weight up to what it should be?

5. One tire costs ..... What will ..... tires like this tire cost?

6. A man gave ..... cents to ..... children. Each child received the same number of cents. How many cents did each child get?

7. John is ..... inches tall. Dick is ..... inches tall. How much taller is John than Dick?

8. Clara spent ..... Fay spent ..... How much did both spend?

PROBLEM SCALE NO. 8

219. Problems about Boys and Girls. (WRITTEN WORK.) If you work every problem correctly, you will earn 30 points. Work the problems, and find your score as you have learned to do. Then find out for yourself how well you have done your work.

Below you will find six rules. Read them carefully and try to use them as you work the problems in this article.

1. Read the problem carefully.
2. Think what you are asked to find.
3. Think what you will do to get the answer.
4. Think if you need to use other numbers than those that are in the problem.
5. Decide whether there are numbers in the problem that you do not need to use.
6. Estimate a reasonable answer.
7. After you have worked the problem, look at your answer and decide whether it is a reasonable one.

1. Jane's doll had only three dresses; so Jane made her four more dresses. How many dresses did her doll have then? (2)

2. Mary and Ellen wanted to draw pictures. They had eight colored crayons. Each girl took half of them. How many crayons did each girl have then? (3)

3. Jack tried to play golf. His uncle gave him 11 old golf balls. The first day Jack lost 3 of the balls. How many of the golf balls did he have left? (3)

4. It was 225 yards to the first hole, 315 yards to the next hole, 482 yards to the third hole, 422 yards to the fourth hole, and 185 yards to the fifth hole. How many yards was it from the start to the fifth hole? (5)

5. Jack earned 10 cents each time he was caddy for his grandfather. During one month he caddied 7 times for his grandfather. How much money did he earn in this way? (5)

6. Ted carried papers every afternoon. He left one paper at each of 32 homes. How many papers did he deliver in seven days? (5)

7. Ted was paid one cent for each paper he delivered. How much money did he earn each day? (7)

STANDARDS

Superior work:	19–30 points	Slow work:	9–12 points
Good work:	16–18 points	Inferior work:	0– 8 points
Average work:	13–15 points		

220. Rapid Drill. (CLASS WORK.) The practice in this article will help you to make better scores on your Self-testing Drills. Study for five minutes.

	(A)	(B)	(C)	(D)	(E)
1.	\$.68 is read.....	9+5+7	14−5	18+5+5	9×4+7
2.	26+3+2	17−8	5×9+4	12÷3	14+5+9
3.	11−6	1 ft. =....in.	16+5+8	13−....=6	20÷. .=4
4.	$5\overline{)30}$	15+5+10	11−3	17+4+7	8× ...=32
5.	29+4+6	16−. ..=7	4×....=28	1 yd. =....ft.	18−....=9
6.	7×0+0	14−6	$\frac{1}{3}$ of 27	40+15	6×...=24
7.	13−5	40×9	19+3+7	$\frac{1}{5}$ of 40	14−....=5

221. Problems about a Boys' Club. (WRITTEN WORK.) Mr. Curtis told a boys' club they could build a dam across a little creek which ran through his pasture. There were 8 boys in the club.

1. The place where the boys chose to build their dam was 9 feet wide. How many yards wide was it?

2. Before the dam was built, the water was 9 inches deep at that place; after the dam was built it

was 27 inches deep. How many times as deep was the water after the dam was built as it was before?

3. The top of the dam was 4 inches higher than the water. The dam was ..... ft. and ..... in. high.

4. James Curtis brought some pieces of an old cement sidewalk to use in the dam. He made 3 trips with a horse and wagon and brought 20 pieces each trip. How many pieces did he bring all together?

5. How many pieces of cement were needed for the dam if there were 3 rows across the creek and 10 pieces in each row?

6. After the dam was built, the eight boys had a picnic. Dick made the sandwiches. He made four for each boy. How many sandwiches did he make?

7. Tom made lemonade for the boys. He made a pint for each boy. How many quarts of lemonade did he make?

SHORT DIVISION WITH CARRYING AND REMAINDERS

222. Getting Ready to Carry in Division. (CLASS WORK.) Have you noticed that it pays to "get ready" to do things? Did you ever get the soil in a garden ready before planting seeds? It paid you to do it, didn't it?

Do you remember the many times in this book that you were helped to "get ready" to do new things? You practiced doing things that you knew how to do in order to learn how to do other things that you did not know how to do. New things are much easier to learn if you "get ready" for them.

Now you are going to practice some subtraction examples that will help you to "carry" in division. It will be fun, because you really know how to do it. You just need more practice now.

	(*A*)	(*B*)	(*C*)	(*D*)	(*E*)
1.	6−4	18−15	10−8	24−20	13−10
2.	8−5	20−18	15−12	12−10	22−20
3.	5−3	7−5	30−28	19−16	29−27
4.	7−4	11−9	23−21	26−24	39−35
5.	9−5	14−10	27−24	31−28	34−32
6.	8−6	19−15	18−16	35−32	37−35
7.	11−8	23−20	33−30	47−45	44−40
8.	14−12	27−25	29−25	32−30	38−35
9.	28−25	34−30	43−40	49−45	42−40
10.	17−15	38−36	48−45	39−36	

223. Finding Remainders. (CLASS WORK.) Give the answers to the following problems.

1. How many 3¢ postage stamps can you buy with a dime, and how many cents will you have left?

2. At 4¢ each, how many oranges can you buy with 15¢, and how many cents should you receive in change?

3. For 15¢ how many 2¢ stamps can you buy, and how many cents should you receive in change?

Read these:

4. In 10 there are three 3's and 1 remainder. Three 3's = 9, + **1** = 10.

> 10 = 3 + 3 + 3 + 1
> 10 ÷ 3 = 3 and 1 more
> The 1 is called a **remainder.**

5. In 10 there are two 4's and 2 remainder. Two 4's = 8, + **2** = 10.

6. In 15 there are seven 2's and 1 remainder. Seven 2's = 14, + **1** = 15.

7. In 15 there are three 4's and 3 remainder. Three 4's = 12, + **3** = 15.

8. In 15 there are three 5's and **no** remainder. Three fives = 15, + **0** = 15.

Give the answers to these and fill in the blanks:

9. 7 = how many 2's and what remainder?

10. 8 = how many 2's and what remainder?

11. 7 = ...3's and.....remainder.

12. 20 = ...3's and.....remainder.

SELF-TESTING DRILL NO. 15

224. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. Find your score and make your record on the Score Card. **Try to beat all your past records.**

1.
134
$\times 6$

2.
64
38
67
8

3. $3\overline{)189}$

4. $4\overline{)800}$

5.
515
-279

6. What is the answer if you divide fourteen by two?

7. 135 multiplied by 7 = ?

8. Divide 105 by 5

9. Divide 180 by 2.

10. $859 - 477 = ?$

11. $156 \times 4 = ?$

12. $210 \div 3 = ?$

13. Multiply one hundred twenty by eight.

14. Add eighty-nine, six, sixty-five, and seventy.

15. Subtract five hundred ninety-one from eight hundred seventy.

STANDARDS

Number correct..	0	1	2–3	4	5	6	7	8–9	10	11–14	15
Scores	0	1	2	3	4	5	6	7	8	9	10

If you made mistakes on this drill, be sure to correct them before you take the next drill.

225. Finding Quotients with Remainders. (ORAL WORK.) Give quotients and remainders, if any.

Sample Answers: The answer to $2\overline{)7}$ is "3 and 1 remainder." The answer to $3\overline{)21}$ is, "7 and no remainder," or just "7."

	(A)	(B)	(C)	(D)	(E)	(F)
1.	$2\overline{)7}$	$3\overline{)21}$	$2\overline{)15}$	$3\overline{)22}$	$5\overline{)11}$	$5\overline{)7}$
2.	$3\overline{)5}$	$2\overline{)9}$	$3\overline{)13}$	$4\overline{)5}$	$5\overline{)6}$	$4\overline{)13}$
3.	$2\overline{)3}$	$3\overline{)16}$	$3\overline{)14}$	$4\overline{)6}$	$4\overline{)7}$	$5\overline{)9}$
4.	$3\overline{)7}$	$2\overline{)11}$	$2\overline{)17}$	$3\overline{)23}$	$4\overline{)10}$	$4\overline{)14}$
5.	$2\overline{)5}$	$3\overline{)11}$	$3\overline{)20}$	$4\overline{)9}$	$3\overline{)26}$	$4\overline{)19}$
6.	$2\overline{)14}$	$3\overline{)10}$	$2\overline{)19}$	$3\overline{)25}$	$4\overline{)11}$	$5\overline{)14}$
7.	$3\overline{)4}$	$2\overline{)13}$	$3\overline{)27}$	$4\overline{)32}$	$3\overline{)29}$	$4\overline{)15}$
8.	$3\overline{)8}$	$3\overline{)19}$	$3\overline{)17}$	$3\overline{)28}$	$5\overline{)8}$	$5\overline{)12}$
9.	$4\overline{)17}$	$5\overline{)19}$	$4\overline{)21}$	$5\overline{)34}$	$4\overline{)34}$	$5\overline{)47}$
10.	$5\overline{)13}$	$5\overline{)26}$	$5\overline{)32}$	$4\overline{)29}$	$5\overline{)38}$	$5\overline{)25}$
11.	$5\overline{)21}$	$4\overline{)22}$	$5\overline{)29}$	$5\overline{)37}$	$5\overline{)44}$	$4\overline{)35}$
12.	$4\overline{)23}$	$5\overline{)23}$	$4\overline{)36}$	$5\overline{)40}$	$4\overline{)26}$	$5\overline{)49}$
13.	$5\overline{)16}$	$5\overline{)27}$	$5\overline{)31}$	$4\overline{)31}$	$5\overline{)41}$	$4\overline{)38}$
14.	$4\overline{)28}$	$5\overline{)24}$	$4\overline{)27}$	$5\overline{)36}$	$5\overline{)15}$	$4\overline{)37}$
15.	$5\overline{)18}$	$4\overline{)25}$	$5\overline{)33}$	$4\overline{)33}$	$5\overline{)43}$	$5\overline{)35}$
16.	$4\overline{)18}$	$5\overline{)22}$	$4\overline{)30}$	$5\overline{)39}$	$4\overline{)16}$	$5\overline{)48}$
17.	$5\overline{)17}$	$5\overline{)28}$	$5\overline{)30}$	$5\overline{)42}$	$5\overline{)46}$	$4\overline{)39}$

226. Division with Carrying. (CLASS WORK.) Study the Hints, which show how to get the answers to the problems below. This work will teach you how to carry in division.

1. Clara's mother ordered two pounds of butter. When the bill came, it showed that the butter cost 96 cents. How much did one pound of the butter cost?

HINTS

(*A*) Think what to do.

(1) Two pounds cost 96 cents.
(2) One pound cost $\frac{1}{2}$ of 96 cents.
(3) To find $\frac{1}{2}$ of 96¢, divide 96¢ by 2.

(*B*) The Work: *Divide by 2*

$$2\overline{)96¢}\quad 48¢$$

(1) Think "2 into 9 goes 4 times with 1 to carry."
(2) Write the 4 over the 9 and carry the 1 to the 6 to make 16.
(3) Think "2 into 16 goes 8 times."
(4) Write the 8 over the 6.
(5) Write the cents' sign (¢) after the 48.
(6) The answer is 48¢ for one pound.

(*C*) This is the check:

$$\begin{array}{r} 48¢ \\ \times 2 \\ \hline 96¢ \end{array}$$

(1) The quotient $\times 2$ should equal 96¢.
(2) $48¢ \times 2 = 96¢$.
(3) 48¢ is the correct answer.

2. Arthur had saved the pennies he got from selling vegetables at the market. He counted them. He had 174 pennies.

He wanted to divide the pennies equally among his three younger sisters. How many should he have given to each sister?

HINTS

(*A*) Think what to do.

(1) Arthur had 174 pennies.

(2) Each of three sisters was to have $\frac{1}{3}$ of the 174 pennies.

(3) Arthur had to find $\frac{1}{3}$ of 174 pennies.

(4) To find $\frac{1}{3}$ of 174 pennies, divide 174 pennies by 3.

(*B*) The Work: *Divide by 3*

58 pennies
3)174

(1) Think "3 into 17 goes 5 times with 2 remainder."

(2) Write the 5 over the 7 and carry the 2 to the 4 to make 24.

(3) 3 into 24 goes 8 times.

(4) Write the 8 over the 4.

(5) The answer is 58 pennies for each sister.

(*C*) This is the check:

58
×3
174 pennies

(1) The quotient ×3 should equal 174.

(2) $58 \times 3 = 174$.

(3) Answer, 174 pennies, is correct.

3. At 4 cents each, how many apples can you buy for 72 cents?

(*A*) What must you do?

(*B*) This is the **way** to find out.

$$4\overline{)72¢}\quad 18 \text{ apples}$$

(*C*) This is the **check:**

$$\begin{array}{r} 18 \\ 4 \\ \hline 72 \text{ cents} \end{array}$$

HINTS

(1) 4 into 7 goes 1 time with 3 to carry.

(2) Write the 1 over the 7 and carry the 3.

(3) 4 into 32 goes 8 times.

(4) Write the 8 over the 2.

(5) Answer: 18 apples.

EXERCISE

Notice what was carried in these four examples.

1.	2.	3.	4.
$2\overline{)96¢}\quad 48¢$	$3\overline{)174}$ pennies $\quad 58$ pennies	$4\overline{)72¢}\quad 18$ apples	$5\overline{)205}\quad 41$
1 carried	*2 carried*	*3 carried*	*nothing carried*

In division as well as in addition and multiplication you sometimes carry 1, sometimes 2, and other times 3 or more. Sometimes you don't carry at all.

Tell what is carried in Examples 5 to 16 at the top of page 297. The right answer to Example 5 is, "2 is carried to the 1 to make 21."

5.	6.	7.	8.	9.	10.
17	32	24	19	29	19
$3\overline{)51}$	$2\overline{)64}$	$4\overline{)96}$	$5\overline{)95}$	$3\overline{)87}$	$4\overline{)76}$
11.	**12.**	**13.**	**14.**	**15.**	**16.**
56	57	28	77	46	53
$2\overline{)112}$	$3\overline{)171}$	$5\overline{)140}$	$4\overline{)308}$	$3\overline{)138}$	$4\overline{)212}$

PROBLEM SCALE NO. 9

227. Problems about Children's Affairs. (WRITTEN WORK.) If you work every problem correctly, you will earn 52 points. Find your score as you have learned to do and then see for yourself what kind of problem work you are doing.

1. Carl weighs 84 pounds and Paul weighs 77 pounds.
   (*a*) Which boy is the heavier? (4)
   (*b*) How much heavier? (5)

2. Pupils in the third grade took turns telling Mr. Jones, the school principal, the number of pupils there were on the first floor of the school each morning.

It was Esther's turn one day. That day there were 28 pupils in the first grade, 37 in the second, 34 in the third, and 29 in the fourth. How many pupils should Esther have reported to Mr. Jones? (5)

3. Which of these three division examples gives the largest quotient? (6)

(*a*) $3\overline{)27}$ (*b*) $2\overline{)14}$ (*c*) $3\overline{)24}$

4. Henry had saved $9.60. He put half of this money in the bank and spent the other half for a sled. How much did he put in the bank? (6)

5. There were 216 stamps in a stamp collection. The collection belonged to three boys. Each of the three boys took a third of the stamps. How many stamps did each boy take? (6)

6. A quarter of a dollar and a nickel are equal to how many dimes? (6)

7. The Penn School has 8 classrooms and an assembly room. There are 4 windows in each classroom and 9 windows in the assembly room. How many windows are there in all these rooms together? (7)

8. Three boys bought a stamp collection from a bookstore. The collection cost 75 cents. Each boy paid an equal share. How much did each boy pay? (7)

STANDARDS

Superior work:	28–52 points	Slow work:	8–13 points
Good work:	17–27 points	Inferior work:	0– 7 points
Average work:	14–16 points		

SELF-TESTING DRILL NO. 16

228. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. Make a record of your score on the Score Card. **Try to beat all your past records.**

1. *Subtract:*

$$\begin{array}{r} 92 \\ 47 \\ \hline \end{array}$$

2. How many 3-cent stamps can you buy for 15 cents?

3.

$$\begin{array}{r} 115 \\ 149 \\ 436 \\ 66 \\ \hline \end{array}$$

4. How many dimes are there in 70 cents?

5.

$$\begin{array}{r} 8 \\ 428 \\ 209 \\ 16 \\ 609 \\ \hline \end{array}$$

6. $781 - 284$

7. $87 \times 5 =$

8.

$$\begin{array}{r} 81 \\ 74 \\ 398 \\ 194 \\ \hline \end{array}$$

9. $3\overline{)219}$

10. How many days are there in 5 weeks?

11. Divide 350 by 5.

12. $4\overline{)404}$

13. $145 \times 7 = ?$

14. Divide 450 by 5.

15. A man works eight hours every day in the week except Saturday and Sunday. On Saturday he works four hours, and on Sunday he does no work. How many hours does he work in a week?

STANDARDS

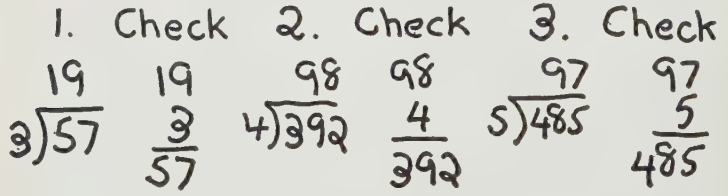
Number correct..	0	1–4	5	6	7–8	9	10	11	12	13–14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

Did you work all the division examples correctly? If not, practice on Articles 295, 296, and 225.

229. Practice in Division with Carrying. (WRITTEN WORK.) Copy the examples and find the quotients. Check your work if you need to.

The picture below shows the way three examples on one girl's paper looked.

She was not sure that her answers were correct; so she checked her work. See if you can do your work as neatly as she did hers.



EXERCISE

1.	2.	3.	4.	5.	6.
3)294	2)194	4)116	3)195	5)355	3)132
7.	**8.**	**9.**	**10.**	**11.**	**12.**
2)176	3)78	3)288	4)328	4)356	5)470
13.	**14.**	**15.**	**16.**	**17.**	**18.**
5)445	4)184	2)160	3)204	4)804	4)380
19.	**20.**	**21.**	**22.**	**23.**	**24.**
5)185	3)237	4)252	5)320	4)268	5)395
25.	**26.**	**27.**	**28.**	**29.**	**30.**
3)141	5)290	4)400	5)405	4)312	5)280

230. Further Study of Division with Carrying. (CLASS WORK.) There are some little "tricks" in division with carrying that you will need to know. If you will remember what you have already learned about carrying in division, you can work every one of these "tricks." Try them.

FIRST TRICK

Do you remember that in addition and multiplication you sometimes carried more than once in the same example? Sometimes you have to carry more than once in division, too. Answer the questions asked about Example (*A*).

(*A*)

$$3\overline{)528}\quad 176$$

(*a*) When 5 was divided by 3, what number was carried?

(*b*) Tell why the 7 is in the quotient.

(*c*) When the 7 was written in the quotient, what number was carried?

(*d*) How many times are numbers carried in this example?

Look at the examples below and tell how many times numbers are carried in each one.

1.	2.	3.	4.	5.	6.
$4\overline{)624}$ 156	$3\overline{)693}$ 231	$2\overline{)150}$ 75	$5\overline{)815}$ 163	$4\overline{)972}$ 243	$5\overline{)450}$ 90
7.	**8.**	**9.**	**10.**	**11.**	**12.**
$4\overline{)240}$ 60	$2\overline{)558}$ 279	$5\overline{)505}$ 101	$4\overline{)748}$ 187	$3\overline{)117}$ 39	$3\overline{)186}$ 62

SECOND TRICK

This trick is very much like the First Trick, but the zeros in it might make it harder for you to work. Don't let them bother you. Answer the questions.

(*B*)

$$4\overline{)700}\quad 175$$

(*a*) What number was carried when the 1 was written in the quotient?

(*b*) Why is the 7 in the quotient?

(*c*) When the 7 was written in the quotient, what number was carried?

(*d*) Why is the 5 in the quotient?

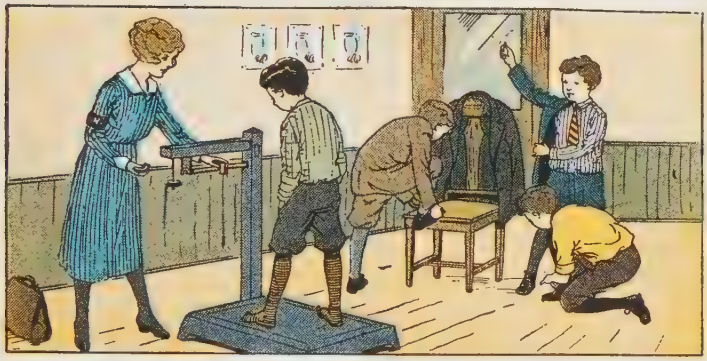
Explain why each figure is in the quotients below.

13.	14.	15.	16.	17.	18.
$4\overline{)608}\quad 152$	$5\overline{)800}\quad 160$	$4\overline{)300}\quad 75$	$3\overline{)504}\quad 168$	$4\overline{)800}\quad 200$	$3\overline{)108}\quad 36$

231. Further Practice in Division with Carrying. (WRITTEN WORK.) Find the quotients in the following examples. Check your work if you are not quite sure the answers are correct.

EXERCISE

1.	2.	3.	4.	5.	6.
$2\overline{)138}$	$4\overline{)108}$	$3\overline{)411}$	$5\overline{)600}$	$4\overline{)592}$	$5\overline{)900}$
7.	**8.**	**9.**	**10.**	**11.**	**12.**
$3\overline{)267}$	$4\overline{)368}$	$4\overline{)156}$	$3\overline{)345}$	$5\overline{)750}$	$4\overline{)272}$
13.	**14.**	**15.**	**16.**	**17.**	**18.**
$5\overline{)260}$	$4\overline{)388}$	$5\overline{)105}$	$5\overline{)190}$	$4\overline{)536}$	$4\overline{)476}$



MEASURES OF WEIGHT

232. The Meaning of Pounds and Ounces. (CLASS WORK.) Have you been weighed in school this year? Do you know how much you weigh? Here is what four boys weigh.

Tom White.....56 pounds. Joe Gordon.....58 pounds.
Billy Dale.....62 pounds. Sam Ball.....65 pounds.

Give the answers to these questions:

1. Which boy weighs the most?
2. Which boy weighs the least?
3. How much heavier is Sam than Billy?
4. How much lighter is Tom than Joe?
5. How much will Tom have to gain to be as heavy as Sam is now?

16 ounces = 1 pound
"oz." is a short way to write ounce or ounces.
"lb." is a short way to write pound or pounds.

6. Where have you ever seen scales like these?

7. Name some things that are weighed on such scales.

8. This grocer has 1 lb. and 12 oz. of butter on the scales. How much more will make exactly 2 lb.?

233. Practice with Pounds and Ounces. (WRITTEN WORK.) Copy these examples and write the number that belongs on each dotted line.

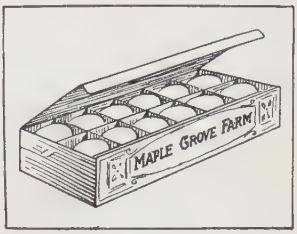
EXERCISE

1. 16 ounces = ... pound.
2. 19 ounces = ... pound and ..... ounces.
3. 24 ounces = ... pound and ..... ounces.
4. 12 ounces plus ..... ounces equal 1 pound.
5. 10 ounces plus ..... ounces equal 1 pound.
6. 14 ounces plus ..... ounces equal 1 pound.
7. 6 oz. + 10 oz. = ... lb.
8. 1 lb. 13 oz. plus ..... ounces equal 2 lb.
9. 2 lb. 8 oz. plus ..... ounces equal 3 lb.
10. 3 lb. 7 oz. plus 9 ounces equal ..... lb.
11. 4 lb. plus ..... ounces equal 5 lb.
12. 2 lb. equal ..... ounces.
13. 2 lb. 10 ounces equal ..... ounces.

THE DOZEN

234. The Use of Dozen. (WRITTEN WORK.) Frank's mother sent him to the store to buy a dozen eggs. Here is a picture of the box he brought home. How many eggs are in a dozen?

EXERCISE



Copy the 9 statements below and fill in the blanks.

1. 14 eggs are 1 dozen and ..... eggs.
2. 17 eggs are 1 dozen and ..... eggs.
3. 19 eggs are 1 dozen and ..... eggs.
4. 11 eggs and ..... egg are a dozen eggs.
5. 9 eggs and ..... eggs are a dozen eggs.
6. 6 eggs and ..... eggs are a dozen eggs.
7. $\frac{1}{2}$ dozen eggs are ..... eggs.
8. A dozen and a half bananas are ..... bananas.
9. Four dozen eggs are ..... eggs.
10. Tom found 9 eggs in a nest. He needed ..... more to make a dozen.

1 dozen = 12.
"Doz." is a short way to write "dozen."

SELF-TESTING DRILL NO. 17

235. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. Make your record on the Score Card. **Try to beat all your past records.**

1. 132×5

2. $416 + 9 + 346 + 5 + 107$

3. $29 + 807 + 64 + 86$

4. $349 + 477 + 309 + 88$

5. $3\overline{)180}$

6. 143×6

7. $617 + 28 + 58 + 279$

8. $3\overline{)261}$

9. $2\overline{)196}$

10. $3\overline{)207}$

11. $402 - 394$

12. $506 - 426$

13. $120 \times 7 = ?$

14. 908 minus 790 = ?

15. $400 + 5 = ?$

STANDARDS

Number correct..	0	1–4	5–6	7	8	9	10	11	12–13	14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

Was your score better than the one you made on Drill 10? Some good practice will help you to do better work. Find the practice you need in the *Self-Help Practice Lessons* beginning on page 368.

PROBLEM SCALE NO. 10

236. Problems about a Sling-Shot Game. (WRITTEN WORK.) If you work every problem correctly, you will earn 56 points. Work the problems, and find your score by adding the numbers that are printed at the right of the problems you worked correctly. Then look at the Standards at the end of the article, and find out for yourself how well you have done your work.

Ben and Dave wanted to use their sling-shots. They put three tin cans in a row.

To hit the large can once counted 2 points.
To hit the middle-sized can once counted 3 points.
To hit the small can once counted 4 points.

1. First, Ben shot at the cans.

(*a*) Ben hit the large can 8 times. How much did this count? (4)

(*b*) Ben hit the middle-sized can 5 times. How much did this count? (5)

(*c*) Ben hit the small can 28 times. How much did this count? (6)

(*d*) What was Ben's score? (6)

2. Then Dave shot at the cans.

(*a*) Dave hit the large can 9 times. How much did this count? (5)

(*b*) Dave hit the middle-sized can 7 times. How much did this count? (6)

(*c*) Dave hit the small can 16 times. How much did this count? (6)

(*d*) What was Dave's score? (6)

3. Which boy had the higher score? (5)

4. How much higher was it? (7)

STANDARDS

Superior work:	42–56 points	Slow work:	5–14 points
Good work:	24–41 points	Inferior work:	0– 4 points
Average work:	15–23 points		

237. Rapid Drill. (CLASS WORK.) This article has more kinds of examples in it than any Rapid Drill you have had. Watch the signs. Study for 10 minutes. Try to find the answers without using pencil.

	(*A*)	(*B*)	(*C*)	(*D*)	(*E*)
1.	1 yd. = ...in.	$15-8$	$9+7+9$	$9\times5+8$	$.40 is read.....
2.	$24\div4$	$18+9+8$	$\frac{1}{3}$ of 21	$27+5+8$	$12-\_\_\_\_=7$
3.	$28+5+9$	$6\times4+5$	$13-8$	$32\div4$	$17+9+8$
4.	$26-7$	$\frac{1}{5}$ of 10	$29+7+8$	$33-9$	$12\div\_\_\_\_=3$
5.	42×2	$15+7+6$	$16-\_\_\_\_=8$	6 yd. = ...ft.	$29+6+8$
6.	$15+6+6$	40×3	$24+7+9$	$24-8$	$\frac{1}{4}$ of 16¢
7.	$\frac{1}{4}$ of 36	$33-4$	50×6	$13+6+9$	$15-\_\_\_\_=9$
8.	$28+7+5$	$2\overline{)0}$	$39+2+7$	40×7	$14+9+9$
9.	$3\overline{)150}$	$25+9+6$	$13-\_\_\_\_=7$	$17+6+1$	6 ft. = ...yd.

SELF-TESTING DRILL NO. 18

238. Directions: Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. Make your record on the Score Card. **Try to beat all your past records.**

1. $8 \times ? = 0$

2. $5\overline{)50}$

3.
$$\begin{array}{r} 106 \\ \times 3 \\ \hline \end{array}$$

4. $5\overline{)170}$

5.
$$\begin{array}{r} 29 \\ 108 \\ 419 \\ 85 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 540 \\ -480 \\ \hline \end{array}$$

7. $275 \div 5 = ?$

8. $9 - 0 = ?$

9. At 30 cents a dozen how much will 3 dozen plums cost?

10. $0 \div 3 = ?$

11. $7 + 0 = ?$

12.
$$\begin{array}{r} 146 \\ 468 \\ 59 \\ 97 \\ \hline \end{array}$$

13. Subtract 501 from 821.

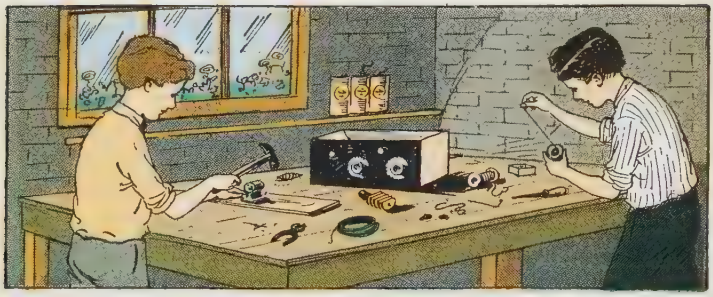
14. Harry Jones, a newsboy, sold 166 papers one Saturday. On the same day Joe sold twice as many. How many did Joe sell?

15.
$$\begin{array}{r} 236 \\ \times 4 \\ \hline \end{array}$$

STANDARDS

Number correct..	0	1–5	6	7	8	9	10	11	12	13–14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

If your score does not satisfy you, practice on this drill in your spare moments.



DIVISION WITH MONEY

239. Dividing Dollars and Cents. (CLASS WORK.) Sometime you and your friends may buy something to use or play with. You will want to find how to divide the cost equally. This article will tell how to do it.

1. Two boys bought the parts for a small radio set. The parts cost \$6.48. The boys divided the cost equally. How much did each boy pay?

(A) Think what to do.

(1) Each boy paid $\frac{1}{2}$ of \$6.48.
(2) To find $\frac{1}{2}$ of \$6.48, divide \$6.48 by 2.

(B) The Work:
Divide by 2

$$\begin{array}{r} \$3.24 \\ 2\overline{)\$6.48} \end{array}$$

(1) Put the cents' point in the quotient straight above the one below it.
(2) 2 into 6 goes 3 times. Write 3 over the 6.
(3) 2 into 4 goes 2 times. Write 2 over the 4.
(4) 2 into 8 goes 4 times. Write 4 over the 8.
(5) Put the dollar sign (\$) before the 3.
(6) The answer is \$3.24 for each boy.

(C) Check:

$$\begin{array}{r} \$3.24 \\ \times 2 \\ \hline \$6.48 \end{array}$$

(1) The product is \$6.48.
(2) The amount divided above is \$6.48.
(3) Since these two amounts are the same, the quotient is probably correct.

2. Five girls bought a sick lady a bouquet of flowers and divided the cost equally. The flowers cost \$1.75. How much did each girl pay?

(*A*) Think what to do.

(1) Each girl paid $\frac{1}{5}$ of \$1.75.
(2) To find $\frac{1}{5}$ of \$1.75, divide \$1.75 by 5.

(*B*) The Work: *Divide by 5*

$$5\overline{)\$1.75}\quad \$\ .35$$

(1) Put the point in the quotient straight above the one below.
(2) 5 into 17 goes 3 times with 2 to carry.
(3) Write 3 over the 7 and carry the 2.
(4) 5 into 25, 5 times. Write 5 over the 5.
(5) Put the dollar sign in the quotient.
(6) The answer is 35 cents for each girl.

(*C*) Check:

$$\begin{array}{r} \$\ .35 \\ \times 5 \\ \hline \$1.75 \end{array}$$

(1) The product is \$1.75.
(2) The amount divided above is \$1.75.
(3) The quotient is probably correct, since these two amounts are the same.

Thirty-five cents may be written two ways: \$ .35 or 35¢

3. This is how to divide \$24.00 by 4. ➸ Be sure that you **always** put the cents' point **where it belongs.**

$$4\overline{)\$24.00}\quad \$\ 6.00$$

Questions. (*a*) In dividing dollars and cents, where should you always put the cents' point in the quotient?

(*b*) What would the quotient for the example be if the point had been left out?

240. Practice in Dividing Dollars and Cents. (WRITTEN WORK.) Copy the following examples and find the quotients. Remember the cents' point and the dollar sign.

EXERCISE

1.	2.	3.	4.	5.
$3\overline{)\$2.55}$	$4\overline{)\$2.32}$	$2\overline{)\$7.10}$	$5\overline{)\$1.10}$	$3\overline{)\$1.41}$
6.	**7.**	**8.**	**9.**	**10.**
$4\overline{)\$2.96}$	$3\overline{)\$18.00}$	$5\overline{)\$20.00}$	$3\overline{)\$1.68}$	$5\overline{)\$2.10}$
11.	**12.**	**13.**	**14.**	**15.**
$4\overline{)\$33.00}$	$5\overline{)\$12.35}$	$4\overline{)\$34.76}$	$5\overline{)\$49.05}$	$4\overline{)\$20.52}$

PROBLEM SCALE NO. 11

241. Problems about Pupils. (WRITTEN WORK.) If you work every problem correctly, you will earn 60 points. Work the problems, and find your score as you have learned to do. Then see how well you have done.

1. Ruth went to the store to get a half dozen eggs. How many eggs are in a half-dozen? (3)

2. Edward and Paul are brothers. Paul is 4 feet 7 inches tall and Edward's height is 4 feet 3 inches.

(*a*) Which boy is the taller? (4)

(*b*) How much taller? (5)

3. Robert's father had 84 chicks. He sold 17 of these to a friend. How many chicks were left? (5)

4. Many pupils have two weeks of vacation at

Christmas time. How many days of Christmas vacation do they have? (5)

5. James is paid 5¢ a day for taking care of his father's hens. He is saving to buy a pair of skates costing $1.50. How many days must he take care of the hens in order to save enough money to buy the skates? (5)

6. There are 174 pages in a book that Helen is reading. She has read 94 pages. How many more pages has she left to read? (6)

7. How much money does Dorothy need to buy five pounds of sugar if it costs 8 cents a pound? (6)

8. How much money must Charles save in order to buy the following Christmas presents?

A picture ..... $1.00. A book .... 65 cents.
A necktie ..... 75 cents. A toy ..... 45 cents. (6)

9. The Good Citizen Club of the Irving School decided to give a play to earn money for a new flag. The flag cost $15.55. How many tickets at 5 cents each did they need to sell to pay for the flag? (7)

10. The Club sold 375 tickets at 5 cents each. How much money did they get from the ticket sale? (8)

STANDARDS

Superior work:	33–60 points	Slow work:	11–17 points
Good work:	24–32 points	Inferior work:	0–10 points
Average work:	18–23 points		

SELF-TESTING DRILL NO. 19

242. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. Make your record on the Score Card. **Try to beat all your past records.**

1. $706 - 406$

2. $213 - 104$

3. 156×5

4. $4\overline{)160}$

5. Seven nickels equal how many pennies?

6. 24×9

7. $71 + 73 + 42 + 608 + 15$

8. $8 \times 45 = ?$

9. At 5 cents each how many apples can be bought for 45 cents?

10. $246 \times 3 = ?$

11. Multiply 123 by 8.

12. $98 + 728 + 219 + 107 + 69$

13. Sixty-seven + fifty-nine + seven = ?

14. How many inches are there in $\frac{1}{2}$ foot?

15. How many inches are there in 2 feet 6 inches?

STANDARDS

Number correct....	0	1–5	6–7	8	9	10	11	12	13	14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

If your score is low, work on the *Self-Help Practice Lessons* beginning on page 368 for extra practice.

243. Rapid Drill. (CLASS WORK.) Study these examples for five or ten minutes and be ready to tell what belongs on the blanks.

EXERCISE

	(*A*)	(*B*)	(*C*)
1.	$12-3=\_\_\_\_$	$8\times\_\_\_\_=32$	$6=12-\_\_\_\_$
2.	$10-\_\_\_\_=4$	$\_\_\_\_+9=14$	$11-4=\_\_\_\_$
3.	$7\times\_\_\_\_=28$	$13-\_\_\_\_=7$	$\_\_\_\_\div 3=8$
4.	$3=15\div\_\_\_\_$	$12-7=\_\_\_\_$	$6\times\_\_\_\_=30$
5.	$12-8=\_\_\_\_$	$5\div\_\_\_\_=1$	$5=10-\_\_\_\_$
	(*D*)	(*E*)	(*F*)
6.	$\_\_\_\_+5=13$	$11-\_\_\_\_=2$	$\_\_\_\_+5=14$
7.	$11-\_\_\_\_=5$	$\_\_\_\_\times 9=0$	$11-\_\_\_\_=9$
8.	$\_\_\_\_\times 9=36$	$12-4=\_\_\_\_$	$7=35\div\_\_\_\_$
9.	$14-5=\_\_\_\_$	$17+9=\_\_\_\_$	$8=10-\_\_\_\_$
10.	$\_\_\_\_\div 4=6$	$11-\_\_\_\_=8$	$16-\_\_\_\_=8$
	(*G*)	(*H*)	(*I*)
11.	$36=\_\_\_\_\times 4$	$40\div\_\_\_\_=8$	$14-8=\_\_\_\_$
12.	$15-7=\_\_\_\_$	$32=\_\_\_\_\times 4$	$\_\_\_\_\times 6=24$
13.	$16+9=\_\_\_\_$	$17-8=\_\_\_\_$	$\_\_\_\_\div 5=6$
14.	$14-\_\_\_\_=5$	$\_\_\_\_+8=15$	$12-\_\_\_\_=3$
15.	$6=\_\_\_\_-7$	$4=\_\_\_\_-9$	$8=\_\_\_\_-5$

244. Review Practice. (WRITTEN WORK.) Find the answers to the following thirty-six examples. Check or prove your work if you are not quite sure your answers are correct.

EXERCISE

1.	2.	3.	4.	5.	6.
655	959	54		145	813
−78	+77	×7	4)204	−46	−738
7.	**8.**	**9.**	**10.**	**11.**	**12.**
910		690	104	796	112
−716	3)936	−93	×8	+229	−45
13.	**14.**	**15.**	**16.**	**17.**	**18.**
	321	466	464	976	813
5)205	−276	+598	−65	×1	−724
19.	**20.**	**21.**	**22.**	**23.**	**24.**
189	152	578	481		666
×5	−56	+967	−89	1)602	−599
25.	**26.**	**27.**	**28.**	**29.**	**30.**
126	504		124	512	410
−57	+407	2)222	×6	−417	−256
31.	**32.**	**33.**	**34.**	**35.**	**36.**
	342	563	143	187	255
3)227	−84	+887	×7	−89	−77

SUMMARY

245. General Review. (WRITTEN WORK.) If you can give the correct answers to the questions and examples in this article, you will be sure that you have remembered very well the many lessons you had earlier in the book.

Find the answers:

1. $26=8+8+8+$ .....

2. Show another way to write \$.35.

3. How many doughnuts should Max buy if his mother asks him to buy a dozen?

4. The answer in division is called the .....

5. $0\times 8=?$

6. How many dimes are there in 90 cents?

7. 69 equals ..... tens and ..... ones.

8. $4\overline{)408}$

9. 18 ounces equal ..... pound and ..... ounces.

10. Five hundreds, no tens, eight ones, is written in figures .....

11. $5\overline{)\$7.50}$

12. Six pints are ..... quarts.

13. *Write in figures:* six thousand three hundred nine.

14. $3\overline{)900}$

15. Frances drank four glassfuls of water one day. How many pints of water did she drink that day?

Copy and fill in the blanks:

16. ..... glassfuls = 1 pint.

17. ..... pints = 1 quart.

18. ..... quarts = 1 gallon.

19. Check the answer to this example: $3\overline{)249}$. 83

20. Write each of the following words a shorter way:

inches	pints
feet	quarts
yards	gallons
pounds	cents
ounces	dollars

21. How many inches are there in $\frac{1}{3}$ of a foot?

Copy these examples and put in the correct signs:

22. 27 ..... 3 = 9

23. 6 ..... 2 = 12

24. 9 ..... 3 = 6

25. 9 ..... 4 = 5

26. 9 ..... 8 = 17

27. 9 ..... 2 = 18

CHAPTER X

MULTIPLICATION AND DIVISION WITH SIX, SEVEN, EIGHT, AND NINE. TELLING TIME

SIX IN MULTIPLICATION

246. What You Know and What You Need to Learn. (Class Work.) By this time you have learned many things about addition, subtraction, multiplication, and division. In these four very important parts of arithmetic work there are 390 facts that you need to know. Study the chart below and answer the questions on this page and the next.

	Addition Facts	*Subtraction Facts*	
A	**100**	**100**	S
	You know these.	You know these.	
	Multiplication Facts	*Division Facts*	
	100	**90**	
M	You know 84 **To learn** **16** 100	You know 50 **To learn** **40** 90	D

1. Do you know the 100 addition facts so that you can say them rapidly without a mistake? Turn to Article 15 and try it.

2. Try the 100 subtraction facts on pages 38 and 39.

3. How many division facts do you know, and how many are there to learn?

4. Look on page 229 and tell how many multiplication facts you had learned at that time. How many more are there to learn?

5. Give the products for the multiplication facts in the squares on page 229.

By this time you have also learned how to study arithmetic. Now it will be easier for you to learn new things. You will work hard to learn the other multiplication and division facts, won't you?

To Be Learned { 16 Multiplication Facts
40 Division Facts

Do you want to start now to learn these new facts? The next article will give you a start.

247. Six in Multiplication. (Class Work.) There are a few more multiplication facts using 6 that you will need to know.

The 16 new multiplication facts that you need to learn belong in these boxes. You are going to learn the new **sixes** now. After you learn the four in the top row, it will be easy to learn the other three.

The New Sixes

6×6	6×7	6×8	6×9
7×6	?	?	?
8×6	?	?	?
9×6	?	?	?

Look at the columns at the left below and give the products for the multiplication facts at the right.

The Slow Way—Add				*The Quick Way*—Multiply	
6	8	7	9	(*A*)	$6\times6=$
6	8	7	9		
6	8	7	9	(*B*)	$6\times7=$
6	8	7	9		
6	8	7	9	(*C*)	$6\times8=$
6	8	7	9	(*D*)	$6\times9=$

Give the missing numbers:

1. Six 6's =
2. Six 8's =
3. Six 7's =
4. Six 9's =
5. $6\times\ldots=42$
6. $6\times\ldots=48$
7. $6\times\ldots=54$
8. $6\times\ldots=36$
9. $54=6\times\ldots$
10. $36=6\times\ldots$
11. $42=6\times\ldots$
12. $48=6\times\ldots$

If you have learned the four new multiplication facts shown above in the boxes, you should be able to give the answers to three others. Here they are:

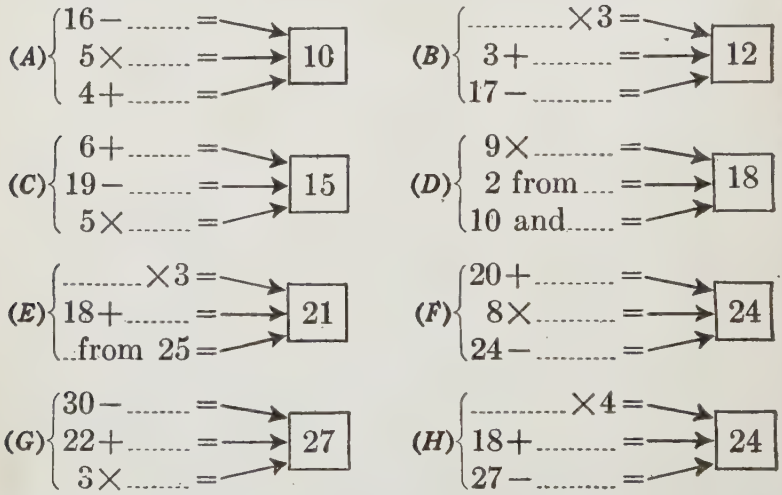
The Four Facts You Know		*The Three Others to Learn*
6×8	equals	8×6
6×7	equals	7×6
6×9	equals	9×6
6×6		

1. $6\times6=$
2. $6\times8=$
3. $9\times6=$
4. $8\times6=$
5. $6\times9=$
6. $7\times6=$
7. $6\times7=$

Put these seven multiplication facts on slips of paper or cardboard with the correct answers on the back,

and practice on them until you can say their products without a mistake. This is good home work. Keep these seven slips to use later.

248. Review Drill. (ORAL PRACTICE.) Read the examples below, giving the missing numbers.



249. Estimating Answers. (CLASS WORK.) This lesson will help you learn how to decide whether your answers are about correct.

Look at the six examples printed in boxes on this page and the next. Tell which of the answers given is nearest the correct one.

1.	432
	342
	415

Look at the last column to the left and add it before you decide. Is 400, 700, or 1100 nearest the correct answer?

2. 7932
−7814

Look at the last column to the left and then think which of these numbers is nearest the correct answer: 10, 100, 1000.

3. 417
×6

Multiply the last number to the left by 6 and then think which of these numbers is the nearest to the answer:

3000 2100 2406 2700

4. $ 8.25
32.65
23.48
17.65

Which of these amounts do you think is the nearest to the correct answer for Example 4? $80 $100 $95

5. $38.14
×6

Tell which amount is nearest the correct answer for Example 5.

$22.00 $250 $300.00

6. $4\overline{)2804}$

Which number is nearest the correct answer to Example 6?

700 500 800 60

When you have worked a problem or an example, be sure to think whether the answer is about what it should be.

PROBLEM SCALE NO. 12

250. Problems about Indian Study. (WRITTEN WORK.) If you work every problem correctly, you will earn 64 points. Find your score as you have learned to do. Then look at the Standards and find out for yourself how well you can work problems.

As you work these problems, remember what you have learned about good ways to get correct answers to problems. When you have worked a problem, be sure to ask yourself whether your answer is reasonable.

1. A third-grade class was studying about Indians. The pupils made seven large wigwams outdoors. Five long poles were needed for each wigwam. How many poles were needed in all? (4)

2. There were 28 children in the class. An equal number of them played in each wigwam. How many children played in each wigwam? (6)

3. There were 16 boys in the class. All but five of the boys made a bow and four arrows apiece.

(*a*) How many boys made bows and arrows? (6)
(*b*) How many bows were made in all? (6)
(*c*) How many arrows were made in all? (7)

4. The art teacher divided the class into four equal groups. Each group made a booklet about Indians. How many children worked on each booklet? (7)

5. The fifth grade took the third grade to the Public Library to see a collection of real Indian things. In the fifth grade there were thirty-two children. How many children from both of these grades went on this trip? (6)

6. The children went in two groups. Half of each grade went one day, and the other half of each grade went the next day. How many children went each day? (6)

7. The carfare for each of the children cost 5 cents. How much did the carfare for all the children in both grades cost? (8)

8. In 1910 there were 471 Indians in the state of Iowa, and in 1920 there were 529. What was the difference in the numbers of Indians in Iowa in the two years?

STANDARDS

Superior work:	30–64 points	Slow work:	
Good work:	15–29 points	Inferior work:	
Average work:	11–14 points		

251. Getting Ready to Use 6 in Multiplication with Carrying. (ORAL PRACTICE.) Practice on the 57 examples below until you can give the answers quickly and without a mistake.

Do you see where Example 1 in column (*A*) is used in this multiplication? ➙

$$\begin{array}{r} 17 \\ \times 6 \\ \hline \end{array}$$

All the examples in columns (*A*), (*B*), (*C*), and (*D*) below are used in multiplication.

EXERCISE

	(*A*)	(*B*)	(*C*)	(*D*)
1.	$6\times1+4$	$7\times6+4$	$9\times6+1$	$6\times5+4$
2.	$6\times0+5$	$8\times6+3$	$6\times7+2$	$6\times2+4$
3.	$7\times6+1$	$6\times9+4$	$8\times6+4$	$6\times8+1$
4.	$6\times9+1$	$6\times8+2$	$6\times7+4$	$6\times3+5$
5.	$6\times1+5$	$6\times6+4$	$6\times8+3$	$7\times2+4$
6.	$7\times0+4$	$6\times0+4$	$9\times6+4$	$6\times4+4$
7.	$7\times4+4$	$7\times5+4$	$6\times6+3$	$9\times6+2$
8.	$9\times1+5$	$6\times7+1$	$6\times8+5$	$6\times6+2$
9.	$6\times6+5$	$9\times0+5$	$6\times9+5$	$9\times2+5$
10.	$6\times7+3$	$7\times6+2$	$9\times5+5$	$6\times9+3$
11.	$6\times6+1$	$6\times9+2$	$9\times4+5$	$6\times7+5$
	$7\times3+4$	$6\times4+5$	$8\times6+1$	$8\times6+2$
	$\times2+5$	$9\times6+3$	$9\times3+5$	$9\times6+5$
	$+4$	$7\times6+3$	$7\times1+4$	$6\times8+4$

252. Practice with 6 in Multiplication. (WRITTEN WORK.) Copy the examples and find the products.

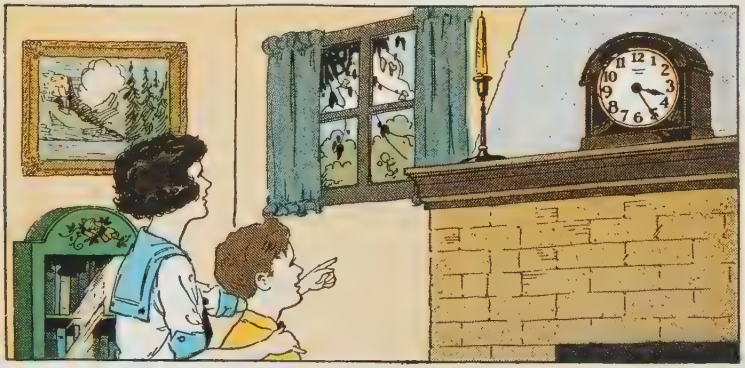
1.	2.	3.	4.	5.	6.
79	106	$.46	106	$.64	64
6	7	8	9	7	9
7.	**8.**	**9.**	**10.**	**11.**	**12.**
$1.07	62	159	106	$.70	65
6	8	6	8	6	9
13.	**14.**	**15.**	**16.**	**17.**	**18.**
72¢	90	$1.06	64¢	127	106
6	6	7	8	6	8

253. Rapid Drill. (CLASS WORK.) Get ready to give the answers to the examples below.

	(*A*)	(*B*)	(*C*)	(*D*)	(*E*)
1.	17 − 8 =	25 + 10 =	$\frac{1}{3}$ of 12 =	12 − ___ = 9	$\frac{1}{2}$ of $1.00 = ___¢
2.	30 ÷ 5 =	15 − 6 =	36 in. = ___ yd.	$\frac{1}{4}$ of 20 =	30 + 15 =
3.	$\frac{1}{4}$ doz. =	24 ÷ ___ = 6	20 + 30 =	$\frac{1}{5}$ of $.40 = ___¢	15 − ___ = 8
4.	13 − 9 =	30 − 10 =	9 qt. = ___ pt.	12 − ___ = 8	$5\overline{)35}$
5.	52 − 10 =	18 pt. = ___ qt.	24 − 5 =	1 lb. = ___ oz.	25 + 20 =
6.	$\frac{1}{4}$ lb. = ___ oz.	31 − 5 =	80 − 40 =	32 qt. = ___ gal.	26 − ___ = 18

TELLING TIME BY THE CLOCK

254. The Clock. (CLASS WORK.) This picture shows Ann telling her brother Allan how to tell time. Read what they are saying, and see if Allan's answers are correct.



ANN: Count the numbers on the clock.

ALLAN: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.

ANN: That means there are 12 hours marked on the clock.

ALLAN: How long does it take the little hand to go from one number to another?

ANN: One hour. The little hand tells what hour it is.

ALLAN: What does the big hand do?

ANN: It tells the minute. It goes from one number to another in 5 minutes.

ALLAN: What time is it by that clock?

ANN: I want you to figure that out, Allan. I will help you. The hands always go around to the right. The little hand is just a little past what number?

ALLAN: Three.

ANN: Remember that the big hand counts five minutes every time it comes to a number. Now begin at 1 and count 5—10—15—and so on until you come to the big hand.

ALLAN: 5—10—15—20—25.

ANN: How many minutes past three o'clock is it?

ALLAN: Twenty-five minutes past three.

Do you think Allan was right?

With a clock face or on the blackboard put the hands so that they will show the following:

1. 5 o'clock
2. 8 o'clock
3. 11 o'clock
4. 15 minutes past 8
5. 30 minutes past 6
6. 20 minutes past 11
7. 15 minutes past 3
8. 20 minutes past 4
9. 35 minutes past 2
10. 40 minutes past 7
11. 50 minutes past 8

12. When the clock shows 50 minutes past 8, how many minutes before 9 is it?

13. Set the clock at 1:15. This is read: "one fifteen," and means 15 minutes past 1.

Set the clock as shown below.

14. 9:20
15. 4:40
16. 6:05
17. 3:45
18. 12 o'clock
19. 10:10

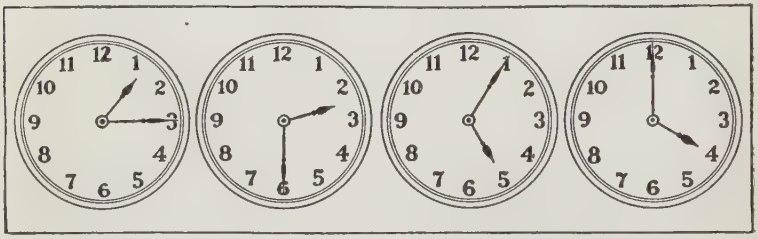
Learn these:

60 minutes = 1 hour
24 hours = 1 day

This is a short way to write these words:

minute, or minutes } **min.** hour, or hours } **hr.**

255. Practice in Telling Time. (Written Work.) Write the numbers from 1 to 10 on your paper and then write after them the answers to the questions below.



(*A*) (*B*) (*C*) (*D*)

1. Which clock says 4 o'clock?
2. Which clock says 2:30?
3. Which clock is 15 minutes past 1?
4. Does clock (*D*) show a later time than clock (*B*)?
5. Does clock (*C*) show earlier time than clock (*D*)?
6. How many hours is it from 1 to 2 o'clock?
7. How many hours is it from 2 to 4 o'clock?
8. How long is it from 9 to 12 o'clock?
9. How many minutes is it from 2 o'clock to 2:30?
10. How many hours and minutes is it from 2 o'clock to 3:30?

SELF-TESTING DRILL NO. 20

256. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. **Try to beat all your past records.**

1.
47
65
404
257

2. 162 $\times 6$

3. 165 $\times 6$

4.
47
307
39
304

5. $426 \times 2 = ?$

6. $4\overline{)336}$

7. $303 - 198 = ?$

8.
603
-495

9. 590 minus 581 = ?

10. $106 \times 9 = ?$

11. Lucy bought a toy for her cousin. It cost 78 cents. She gave the clerk a one-dollar bill. How much change should she have received?

12. $\$3.87 + \$7.54 + \$1.65 + \$.95 =$

13. $\$9.00 - \$8.66 =$

14. One Saturday morning Jack looked at some pairs of skates. One pair was marked \$2.75, and another, \$2.30. What was the difference in their prices?

15. Jack bought the cheaper pair of skates and went skating that afternoon. He stayed too long, and missed $2\frac{1}{2}$ hours of work for which he would have been paid 30¢ an hour. How much money did he lose?

STANDARDS

Number correct	0	1–3	4	5	6	7	8	9	10–11	12–14	15
Scores	0	1	2	3	4	5	6	7	8	9	10

If you did not do well on this drill, practice on it until you can get a score that you like.

DIVIDING BY 6

257. Multiplication and Division Facts with 6. (CLASS WORK.) Give the missing numbers in the multiplication examples just below. This practice will help you to learn how to divide by 6.

EXERCISE

	(*A*)	(*B*)	(*C*)	(*D*)
1.	$6\times2=?$	$?\times6=6$	$24=6\times?$	$54=?\times6$
2.	$?\times6=24$	$36=6\times?$	$6\times0=?$	$6\times?=48$
3.	$6\times?=12$	$9\times6=?$	$7\times6=?$	$30=6\times?$
4.	$30=?\times6$	$?\times6=42$	$6\times?=30$	$42=?\times6$
5.	$18=6\times?$	$6\times5=?$	$?\times1=6$	$6\times?=24$

6. 18 = ... 6's 7. 12 = ... 6's 8. 6 = ... 6

9. 24 = ... 6's 10. 36 = ... 6's 11. 48 = ... 6's

12. 42 = ... 6's 13. 54 = ... 6's 14. 30 = ... 6's

15. At 6¢ each how many pears can I buy for 30¢?

16. If you divide 18 sticks of candy equally among 6 children, how many sticks will each child get?

	(*A*)	(*B*)	(*C*)	(*D*)
17.	$18\div6$	$6\overline{)30}$	$24\div6$	$6\overline{)54}$
18.	$6\overline{)24}$	36 divided by 6	18 divided by 6	$30\div6$
19.	$12\div6$	$42\div6$	$6\overline{)48}$	$6\overline{)36}$
20.	$\frac{1}{6}$ of 18	$\frac{1}{6}$ of 36	$\frac{1}{6}$ of 12	$\frac{1}{6}$ of 48
21.	$\frac{1}{6}$ of 24	$\frac{1}{6}$ of 6	$\frac{1}{6}$ of 30	$\frac{1}{6}$ of 54

258. Getting Ready to Carry in Dividing by 6. (ORAL PRACTICE.) The subtraction examples below will help you when you divide by 6. Practice on them until you can give the differences quickly and without a mistake. Tell how Example 3 in column (*A*) will help you in this division example: ➝ $6\overline{)294}$

	(*A*)	(*B*)	(*C*)	(*D*)	(*E*)
1.	$9-6$	$16-12$	$10-6$	$58-54$	$22-18$
2.	$11-6$	$35-30$	$28-24$	$17-12$	$50-48$
3.	$29-24$	$45-42$	$23-18$	$40-36$	$44-42$
4.	$56-54$	$41-36$	$51-48$	$46-42$	$21-18$
5.	$47-42$	$57-54$	$52-48$	$59-54$	$53-48$

259. Dividing by 6 and Finding Remainders. (ORAL PRACTICE.) Give quotients, and remainders if any.

EXERCISE

	(*A*)	(*B*)	(*C*)	(*D*)	(*E*)	(*F*)
1.	$6\overline{)7}$	$6\overline{)14}$	$6\overline{)21}$	$6\overline{)29}$	$6\overline{)40}$	$6\overline{)49}$
2.	$6\overline{)10}$	$6\overline{)17}$	$6\overline{)26}$	$6\overline{)32}$	$6\overline{)45}$	$6\overline{)58}$
3.	$6\overline{)9}$	$6\overline{)20}$	$6\overline{)23}$	$6\overline{)39}$	$6\overline{)41}$	$6\overline{)50}$
4.	$6\overline{)18}$	$6\overline{)16}$	$6\overline{)31}$	$6\overline{)34}$	$6\overline{)47}$	$6\overline{)42}$
5.	$6\overline{)8}$	$6\overline{)6}$	$6\overline{)27}$	$6\overline{)37}$	$6\overline{)51}$	$6\overline{)53}$
6.	$6\overline{)11}$	$6\overline{)19}$	$6\overline{)33}$	$6\overline{)43}$	$6\overline{)56}$	$6\overline{)59}$
7.	$6\overline{)15}$	$6\overline{)22}$	$6\overline{)28}$	$6\overline{)38}$	$6\overline{)52}$	$6\overline{)55}$
8.	$6\overline{)13}$	$6\overline{)25}$	$6\overline{)35}$	$6\overline{)44}$	$6\overline{)57}$	$6\overline{)46}$

260. Practice in Dividing by 6. (WRITTEN WORK.) Copy and find the quotients. Check your work if you are not sure your quotients are correct.

EXERCISE

1.	2.	3.	4.	5.	6.
$6\overline{)114}$	$6\overline{)168}$	$6\overline{)198}$	$6\overline{)324}$	$6\overline{)204}$	$6\overline{)294}$
7.	**8.**	**9.**	**10.**	**11.**	**12.**
$6\overline{)486}$	$6\overline{)456}$	$6\overline{)564}$	$6\overline{)414}$	$6\overline{)420}$	$6\overline{)516}$
13.	**14.**	**15.**	**16.**	**17.**	
$6\overline{)\$22.56}$	$6\overline{)\$52.02}$	$6\overline{)\$57.60}$	$6\overline{)\$30.30}$	$6\overline{)\$40.92}$	

SELF-TESTING DRILL NO. 21

261. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. Make your record on the Score Card. **Try to beat all your past records.**

1.	2.	3.	4.	5.	6.
187	146	106	$6\overline{)54}$	20	9
$\times 2$	$\times 5$	$\times 8$		95	865
				52	236
				47	378
				687	6

7. Alice made 3 pounds of candy to give to her friends at Christmas time. She wanted to put the candy in half-pound boxes. How many boxes did she need?

8. Divide 486 by 6.

9.

$ .16
5.17
.37
.78

10. Find the difference of 78 and 29.

11. $147 \div 3 = ?$

12. In Postville milk costs 15 cents a quart and 8 cents a pint. Alice's mother ordered 2 quarts and a pint for Christmas day. How much did it cost her?

13. Mary's mother bought a dozen eggs and a quart of milk from a neighbor for 57 cents. In paying for them she handed the neighbor a half dollar and a quarter. How much change should she have received?

14. Mary's mother used a pound and a half of butter in making some cakes and cookies. It cost 46 cents a pound. How much did the butter she used cost?

15. How many ounces are there in 8 pounds?

STANDARDS

Number correct..	0	1–2	3	4	5	6	7	8	9	10–14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

Ask your teacher about anything in this drill that you didn't understand.

MULTIPLICATION WITH 7

262. Seven in Multiplication. (Class Work.) Are you glad there are only nine more of the 100 multiplication facts to learn? Here are five of them:

The 5 new multiplication facts to learn are shown in the boxes.

The other 4 you will learn before long.

The New Sevens

7×7	7×8	7×9
8×7		
9×7		

If you need to do so, add the three columns below to learn the answers to the multiplication facts in the boxes.

The Long Way

7	8	9
7	8	9
7	8	9
7	8	9
7	8	9
7	8	9
7	8	9

The Short-Cuts

(*A*) 7×7 = ?

(*B*) 7×9 = ? = 9×7 = ? (*D*)

(*C*) 7×8 = ? = 8×7 = ? (*E*)

1. At 7¢ each, how much will 7 tablets cost?

2. How many days are there in 9 weeks? (There are 7 days in a week.)

3. One week a man walked 8 miles every day. How far did he walk that week?

Give the missing numbers:

4. Seven 8's = 7. $7\times\ldots\ldots=63$ 10. $56=7\times\ldots\ldots$
5. Seven 7's = 8. $7\times\ldots\ldots=56$ 11. $49=7\times\ldots\ldots$
6. Seven 9's = 9. $7\times\ldots\ldots=49$ 12. $63=7\times\ldots\ldots$

Give the products:

13. $7\times7=$ 15. $9\times7=$ 17. $7\times9=$
14. $7\times8=$ 16. $8\times7=$

Write these five multiplication facts on slips of paper with the correct answers on the back. Practice until you know them. Then put these slips with the seven that you were asked to make on page 321. Practice on the 12 slips until you can give the correct answers as fast as you can lay the slips down.

263. Getting Ready to Use 7 in Multiplication with Carrying. (Oral Practice.) If you will practice on the 55 examples on this page and on page 338 until you can give the correct answers very quickly, you will find it easy to multiply by 7.

EXERCISE

(*A*)	(*B*)	(*C*)	(*D*)
1. $7\times1+5$	$8\times3+5$	$7\times7+2$	$8\times5+5$
2. $7\times7+1$	$9\times7+4$	$7\times9+3$	$7\times8+3$
3. $7\times0+5$	$7\times8+4$	$7\times4+6$	$9\times7+2$
4. $9\times7+1$	$7\times7+5$	$7\times2+6$	$8\times7+3$
5. $7\times8+2$	$7\times9+6$	$7\times3+5$	$7\times6+6$
6. $8\times0+5$	$7\times5+5$	$8\times7+5$	$7\times7+3$
7. $9\times1+6$	$9\times5+6$	$8\times1+5$	$7\times2+5$

	(*A*)	(*B*)	(*C*)	(*D*)
8.	$7\times6+5$	$7\times5+6$	$9\times7+5$	$8\times2+5$
9.	$7\times9+2$	$8\times7+2$	$7\times9+4$	$7\times3+6$
10.	$9\times0+6$	$7\times0+6$	$7\times8+6$	$7\times7+4$
11.	$7\times8+1$	$7\times9+5$	$8\times6+5$	$7\times7+6$
12.	$8\times4+5$	$7\times9+1$	$7\times1+6$	$7\times8+5$
13.	$7\times4+5$	$9\times7+3$	$9\times4+6$	$9\times7+6$
14.	$9\times2+6$	$9\times3+6$	$9\times6+6$	

264. Practice with 7 in Multiplication. (WRITTEN WORK.) Copy the following examples and find the products. Do your work carefully but don't be too slow.

EXERCISE

Find the products:

1.	2.	3.	4.	5.	6.
107	\$.47	\$1.09	97	79	790
7	4	7	5	3	2
7.	**8.**	**9.**	**10.**	**11.**	**12.**
608	\$9.01	258	607	\$.77	770
5	7	4	8	9	8
13.	**14.**	**15.**	**16.**	**17.**	**18.**
170	471	697	\$7.47	978	745
9	8	2	9	3	8

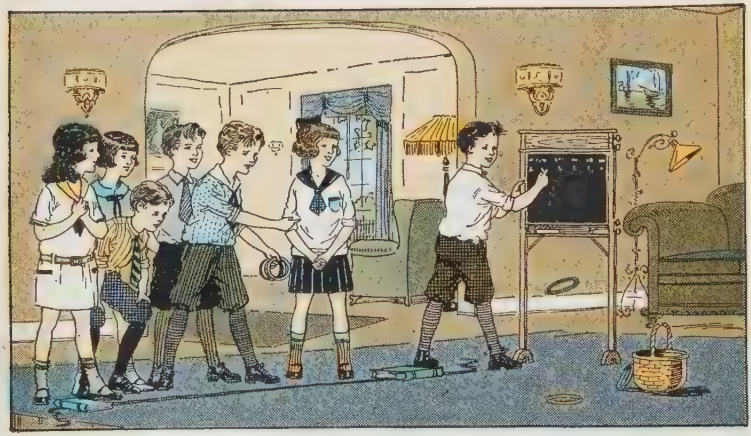
265. Rapid Drill. (CLASS WORK.) Get ready to give the answers to the examples below.

	(A)	(B)	(C)	(D)	(E)
1.	$13-4$	$9+7+7$	$\frac{1}{4}$ of 1 doz.	$11-$ ____ $=6$	$8+6+9$
2.	$4\overline{)364}$	$17-8$	\$1.00 + \$.09	$9\times7+7$	$\frac{1}{6}$ of 42
3.	$30\div6$	$60-40$	$9+5+8$	$24-7$	\$1.50 + \$.25
4.	$13-$ ____ $=4$	$\frac{1}{6}$ of 54	$11-$ ____ $=9$	____ $\div5$ $=6$	$17+6+9$
5.	$19+9+9$	$42-5$	5 qt. = ____ pt.	$28+5+5$	$14-$ ____ $=9$
6.	$\frac{1}{6}$ of 24	$18+9+9$	$25-6$	24 ft. = ____ yd.	$6\times9+4$
7.	$16-$ ____ $=9$	9 gal. = ____ qt.	$5\times9+4$	$23-4$	$59+9+6$
8.	$26+9+6$	$20-7$	$\frac{1}{5}$ of 45	$35+9+9$	$40-3$
9.	$90-70$	$85+15$	$100-9$	$90+20$	$100-30$

PROBLEM SCALE NO. 13

266. Problems about "Forty-five High." (WRITTEN WORK.) If you work every problem correctly, you will earn 65 points. Work the problems, and find your score by adding the numbers that are printed at the right of the problems you worked correctly.

Then look at the Standards at the end of the article, and find out for yourself how well you can work problems.



On November 22d, Jim had a party. The children played a new game called "Forty-five High."

1. Jim brought out three yellow rings, three green rings, and three blue rings. How many rings were there in all? (3)

2. Jim next made a line where each player was to stand. A basket was placed six feet in front of this line. Jim used a yard stick to measure this distance. How many yards did he need to measure? (6)

3. Each player in his turn was to stand on the line and try to throw a ring into the basket.

To get a yellow ring in the basket counted 4.
To get a green ring in the basket counted 5.
To get a blue ring in the basket counted 6.

Records:

Grace:	0 green 0 blue 1 yellow	(*a*) What was Grace's score? (5)
June:	2 green 0 blue 3 yellow	(*b*) What was June's score? (6)
Fred:	1 yellow 2 green 1 blue	(*c*) What was Fred's score? (5)
Jim:	1 green 2 yellow 3 blue	(*d*) What was Jim's score? (6)
Frank:	0 yellow 3 green 2 blue	(*e*) What was Frank's score? (6)
John got all of them in except one green one.		(*f*) What was John's score? (6)

4. What was the highest score anyone could get? (7)

5. Did anyone get the highest possible score? (7)

6. Write the scores of these children, putting the highest score first, then the next highest, and so on. If you do this correctly, the lowest score will be the last one you write. (8)

STANDARDS

Superior work:	33–65 points	Slow work:	5–6 points
Good work:	16–32 points	Inferior work:	0–4 points
Average work:	7–15 points		

SELF-TESTING DRILL NO. 22

267. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. Make your record on the Score Card. **Try to beat all your past records.**

1.	2.	3.	4.	5.
36	$6\overline{)480}$	548	761	27
819		445	−491	×7
12		9		
99	6.	205	7.	8.
	$154 \times 8 = ?$	98	$4\overline{)148}$	178 times 4 = ?

9. *Write in a column and add:* \$2.23, \$.12, \$3.44, \$2.08.

10. Subtract 373 from 772.

11. Every day except Sunday Tom's father drives a truck to another town and back. The distance to the town and back is 78 miles. How far does he drive in a week?

12. One week Tom's father had to make two extra trips to town and back. How far did he drive that week?

13. Tom went with his father one day. They had to take a long detour. Tom noticed that when they left home the speedometer read 614 miles. When they got back, it read 700 miles. How far had they gone that day?

14. On one trip Tom's father left home at 10:30 o'clock in the morning and returned at 4 o'clock in the afternoon. How long was he gone?

15. It took $2\frac{1}{2}$ hours to drive to the other town that day. They stayed there 30 minutes for lunch and then started home. At what time did they start home?

STANDARDS

Number correct..	0	1	2–3	4	5	6	7	8	9	10–14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

DIVIDING BY 7

268. Multiplication and Division Facts with 7. (CLASS WORK.) Give the missing numbers in the multiplication examples from (*A*) to (*K*) on this page and the next.

EXERCISE

	(*A*)	(*B*)	(*C*)	(*D*)
1.	$?\times 7=21$	$35=?\times 7$	$63=?\times 7$	$56=7\times ?$
2.	$7\times 2=?$	$7\times 6=?$	$7\times 0=?$	$28=?\times 7$
3.	$14=?\times 7$	$?\times 7=14$	$7\times ?=56$	$?\times 7=35$
4.	$7\times ?=7$	$7\times ?=49$	$21=7\times ?$	$7\times ?=63$
5.	$28=7\times ?$	$7\times 8=?$	$4\times 7=?$	$?\times 7=21$

Give the missing numbers:

	(*E*)	(*F*)	(*G*)
6.	42 = ... 7's	21 = ... 7's	14 = ... 7's
7.	28 = ... 7's	7 = ... 7	35 = ... 7's
8.	49 = ... 7's	63 = ... 7's	56 = ... 7's

Give the answers:

	(*H*)	(*I*)	(*J*)	(*K*)
9.	$7 \div 7$	$7\overline{)35}$	$63 \div 7$	$7\overline{)56}$
10.	$7\overline{)21}$	$49 \div 7$	$21 \div 7$	$42 \div 7$
11.	$14 \div 7$	56 divided by 7	$7\overline{)28}$	$7\overline{)63}$
12.	$\frac{1}{7}$ of 21	$\frac{1}{7}$ of 7	$\frac{1}{7}$ of 49	$\frac{1}{7}$ of 42
13.	$\frac{1}{7}$ of 28	$\frac{1}{7}$ of 35	$\frac{1}{7}$ of 63	$\frac{1}{7}$ of 56

269. Getting Ready to Carry in Dividing by 7. (ORAL PRACTICE.) Practice on the subtraction examples below. You will find it easier to divide by 7 if you can give the correct answers to these examples quickly.

Can you tell how Example 1 in column (*A*) will help you in this division: $7\overline{)112}$?

EXERCISE

Give the differences:

	(*A*)	(*B*)	(*C*)	(*D*)	(*E*)
1.	$11-7$	$16-14$	$10-7$	$67-63$	$53-49$
2.	$32-28$	$19-14$	$18-14$	$25-21$	$60-56$
3.	$40-35$	$34-28$	$13-7$	$66-63$	$17-14$
4.	$51-49$	$26-21$	$41-35$	$61-56$	$24-21$
5.	$55-49$	$48-42$	$54-49$	$9-7$	$27-21$
6.	$62-56$	$58-56$	$68-63$	$12-7$	$65-63$
7.	$52-49$	$20-14$	$59-56$	$33-28$	$69-63$

270. Dividing by 7 and Finding Remainders. (ORAL PRACTICE.) Practice on the examples below until you can give the answers very quickly.

Give the quotients, and remainders if any:

	(*A*)	(*B*)	(*C*)	(*D*)	(*E*)	(*F*)
1.	$7\overline{)9}$	$7\overline{)13}$	$7\overline{)23}$	$7\overline{)33}$	$7\overline{)47}$	$7\overline{)60}$
2.	$7\overline{)15}$	$7\overline{)25}$	$7\overline{)26}$	$7\overline{)40}$	$7\overline{)53}$	$7\overline{)57}$
3.	$7\overline{)11}$	$7\overline{)19}$	$7\overline{)24}$	$7\overline{)46}$	$7\overline{)48}$	$7\overline{)66}$
4.	$7\overline{)18}$	$7\overline{)32}$	$7\overline{)37}$	$7\overline{)38}$	$7\overline{)58}$	$7\overline{)65}$
5.	$7\overline{)28}$	$7\overline{)27}$	$7\overline{)30}$	$7\overline{)43}$	$7\overline{)51}$	$7\overline{)68}$
6.	$7\overline{)10}$	$7\overline{)20}$	$7\overline{)41}$	$7\overline{)50}$	$7\overline{)52}$	$7\overline{)61}$
7.	$7\overline{)16}$	$7\overline{)34}$	$7\overline{)31}$	$7\overline{)45}$	$7\overline{)62}$	$7\overline{)69}$
8.	$7\overline{)12}$	$7\overline{)22}$	$7\overline{)39}$	$7\overline{)42}$	$7\overline{)67}$	$7\overline{)64}$
9.	$7\overline{)17}$	$7\overline{)29}$	$7\overline{)44}$	$7\overline{)54}$	$7\overline{)55}$	$7\overline{)59}$

271. Practice in Dividing by 7. (WRITTEN WORK.) Copy and find the quotients. Check your work if you are not sure of your answers.

1.	2.	3.	4.	5.	6.
$7\overline{)245}$	$7\overline{)133}$	$7\overline{)560}$	$7\overline{)896}$	$7\overline{)322}$	$7\overline{)910}$
7.	**8.**	**9.**	**10.**	**11.**	**12.**
$7\overline{)469}$	$7\overline{)791}$	$7\overline{)196}$	$7\overline{)553}$	$7\overline{)707}$	$7\overline{)371}$
13.	**14.**	**15.**	**16.**	**17.**	
$7\overline{)\$63.07}$	$7\overline{)\$89.81}$	$7\overline{)\$90.86}$	$7\overline{)\$11.69}$	$7\overline{)\$20.58}$	

PROBLEM SCALE NO. 14

272. Problems about an Easter Party. (WRITTEN WORK.) If you work every problem correctly, you will earn 55 points. Work the problems, and find out for yourself how well you have done.

As you read a problem, watch closely, because you may need to use the answers to the other problems.

1. One day the third grade decided to give an Easter party for the second grade. There were 29 children in the third grade and 26 in the second grade. How many children were there at the party if all came? (3)

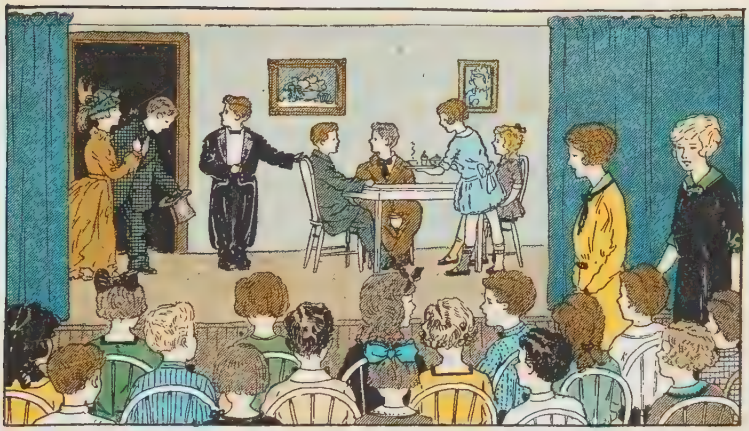
2. The children planned that each second-grade child should have a third-grade partner. How many third-grade children did they think would be left without partners? (4)

3. The class dyed eggs for the party. Five of the third-grade children did not bring any eggs. Each of the others brought one egg. How many eggs did the children bring? (5)

4. The teacher said she would bring some more eggs so that each child at the party could have one Easter egg. How many eggs did she need to bring? (5)

5. The third grade had 70 cents in their class fund. They decided that only half of this fund could be used for the party. How much money could be used for the party? (6)

6. The children bought 3 packages of dye at 5 cents each. How much was spent for dye? (6)



7. Paper napkins for the party cost 15 cents. How much money did the children spend for the dye and the napkins? (6)

8. The day of the party six children were absent. How many paper napkins were used if each child had one napkin? (6)

9. There were 3 songs, 1 dance, 2 games, and a play on the program. How many numbers were there on the program? (6)

10. The play took 10 minutes, but the other numbers took only 4 minutes each. How much time was taken by the program? (8)

STANDARDS

Superior work:	30–55 points	Slow work:	6–12 points
Good work:	18–29 points	Inferior work:	0– 5 points
Average work:	13–17 points		

MULTIPLICATION WITH 8 AND 9

273. Using 8 and 9 in Multiplication. (CLASS WORK.) Now there are only four more of the 100 multiplication facts to learn. Here they are:

1. Write eight 8's in a column and add to find the answer to the first multiplication fact at the right.

2. Find the products for the other three multiplication facts by adding eight 9's, nine 8's, and nine 9's.

The Last Four Multiplication Facts

8×8	8×9
9×8	9×9

Give the missing numbers:

3. Eight 8's = ...
4. Eight 9's = ...
5. Nine 9's = ...
6. 8×....=72
7. 9×....=81
8. 8×....=64
9. 81=9×....
10. 64=8×....
11. 72=8×....
12. 9×....=72
13. 72=9×....

Give the products:

14. 8×9=
15. 9×9=
16. 8×8=
17. 9×8=

Write these four multiplication facts on slips of paper or cardboard with the correct answers on the back. Then put these slips with the seven new 6's and the five new 7's. You will then have 16 slips.

Practice on these at odd times in school and at home until you are sure you can give the correct product for each one. When you practice, arrange the slips in different order each time you try. Pick

out the ones which seem hardest for you and practice most on those.

After you are quite sure that you know these 16 multiplications, put the 16 slips with the other 84 that you were asked to make on page 226. Then practice on the 100, always laying to one side those which seem hardest, so that you can practice them.

274. Review Drill. (WRITTEN WORK.) Copy and give the missing numbers in the examples below. Put the three words "add," "subtract," and "multiply" on your paper toward the top, and write the numbers from 1 to 6 down the left-hand side. Then write the examples and fill in the missing numbers.

Under the word "multiply," write any two numbers that will give the product which is printed. The first one might be $3 \times 6 = 18$.

	Add	*Subtract*	*Multiply*
1.	$11 + \_\_ = 18$	$\_\_ - 18 = 18$	$\_\_ \times \_\_ = 18$
2.	$\_\_ + 22 = 45$	$49 - \_\_ = 45$	$\_\_ \times \_\_ = 45$
3.	$32 + \_\_ = 32$	$\_\_ - 17 = 32$	$\_\_ \times \_\_ = 32$
4.	$\_\_ + 13 = 56$	$86 - \_\_ = 56$	$\_\_ \times \_\_ = 56$
5.	$24 + \_\_ = 36$	$50 - \_\_ = 36$	$\_\_ \times \_\_ = 36$
6.	$50 + \_\_ = 72$	$80 - \_\_ = 72$	$\_\_ \times \_\_ = 72$

275. Getting Ready to Use 8 and 9 in Multiplication with Carrying. (ORAL PRACTICE.) If you will practice on the examples below until you can give the answers quickly and correctly, your multiplication work with larger numbers will be much easier.

Tell how Example 8 in column (*A*) is used in this multiplication: →

$$\begin{array}{r} 85 \\ \times\ 9 \\ \hline \end{array}$$

EXERCISE

	(*A*)	(*B*)	(*C*)	(*D*)
1.	$9\times0+8$	$8\times8+7$	$9\times8+5$	$8\times6+6$
2.	$8\times1+6$	$8\times8+4$	$9\times9+1$	$9\times6+7$
3.	$9\times1+8$	$9\times7+7$	$8\times8+3$	$8\times9+1$
4.	$8\times0+6$	$9\times9+4$	$9\times8+8$	$8\times2+7$
5.	$9\times8+1$	$8\times7+7$	$8\times9+4$	$9\times2+8$
6.	$8\times8+2$	$8\times3+7$	$8\times8+6$	$9\times8+3$
7.	$8\times0+7$	$8\times1+7$	$8\times9+6$	$8\times5+7$
8.	$9\times8+4$	$9\times4+8$	$9\times9+5$	$8\times4+7$
9.	$9\times3+7$	$9\times0+7$	$9\times5+8$	$9\times8+6$
10.	$8\times3+6$	$9\times5+7$	$9\times7+8$	$8\times9+2$
11.	$9\times8+7$	$9\times1+7$	$9\times2+7$	$8\times7+6$
12.	$9\times3+8$	$8\times4+6$	$9\times9+2$	$8\times8+5$
13.	$9\times9+6$	$9\times8+2$	$9\times4+7$	$9\times9+7$
14.	$8\times9+5$	$9\times9+3$	$8\times2+6$	$8\times9+3$
15.	$9\times9+8$	$8\times8+1$	$8\times5+6$	$8\times6+7$
16.	$8\times7+1$	$8\times7+4$	$8\times9+7$	$9\times6+8$

276. Practice with 8 and 9 in Multiplication. (WRITTEN WORK.) Copy and find the products for the examples below.

EXERCISE

1.	2.	3.	4.	5.	6.
798	809	101	689	$4.79	419
9	8	9	7	6	5
7.	**8.**	**9.**	**10.**	**11.**	**12.**
$6.70	989	$.89	989	689	$9.45
8	8	6	9	5	4
13.	**14.**	**15.**	**16.**	**17.**	**18.**
159	$7.79	679	790	486	698
2	8	5	8	9	7
19.	**20.**	**21.**	**22.**	**23.**	**24.**
679	$6.98	179	189	679	589
7	8	6	9	8	6

EXTRA PRACTICE

25.	26.	27.	28.	29.	30.
$.68	900	804	679	489	901
9	4	3	2	5	8
31.	**32.**	**33.**	**34.**	**35.**	**36.**
905	$.98	945	904	809	455
7	6	4	5	6	6

SELF-TESTING DRILL NO. 23

277. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. **Try to beat all your past records.**

1.	2.	3.	4.	5.
850	70	839	484	60
−380	8	29	−177	×8
	736	657		
6.				
27	66	25		
×9				

7. $57 \times 8 = ?$

8. Divide one hundred forty-seven by seven.

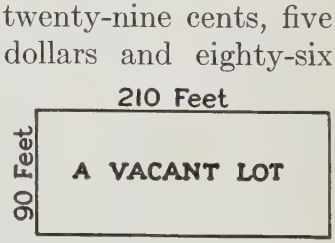
9. $806 \times 9 = ?$

10. 78 times $8 = ?$

11. What is the difference of 558 and 608?

12. *Add:* Three dollars and twenty-nine cents, five cents, eighty-six cents, four dollars and eighty-six cents, and eighty-nine cents.

13. How many feet of fence would be needed to go around this lot?



14. If a man walked along the 210-foot side of the lot shown in the picture and stepped 3 feet each step, how many steps would he take?

15. How many yards is it across the end of the lot?

STANDARDS

Number correct..	0	1–2	3	4	5	6	7	8	9	10–14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

DIVIDING BY 8 AND 9

278. Multiplication and Division Facts Using 8 and 9. (Class Work.) It is a good plan to review multiplication using 8 and 9 before you use these numbers in division. The examples in this article will give you a chance to review and to divide.

EXERCISE

Give the missing numbers:

	(*A*)	(*B*)	(*C*)	(*D*)
1.	$2\times8=?$	$8\times?=24$	$18=9\times?$	$1\times8=?$
2.	$?\times8=32$	$?\times8=0$	$?\times9=36$	$45=?\times9$
3.	$27=?\times9$	$6\times8=?$	$40=?\times8$	$9\times?=54$
4.	$?\times9=9$	$63=9\times?$	$7\times8=?$	$72=?\times9$
5.	$56=?\times8$	$9\times0=?$	$64=8\times?$	$9\times9=?$
6.	$?\times8=72$	$81=9\times?$	$56=8\times?$	$48=8\times?$
7.	$45=9\times?$	$9\times?=36$	$32=?\times8$	$?\times9=54$
8.	$?\times9=27$	$54=?\times9$	$7\times9=?$	$40=8\times?$

	(*E*)	(*F*)	(*G*)
9.	16 = ...8's	9 = ...9	24 = ...8's
10.	27 = ...9's	32 = ...8's	18 = ...9's
11.	8 = ...8	36 = ...9's	40 = ...8's
12.	45 = ...9's	48 = ...8's	63 = ...9's
13.	56 = ...8's	54 = ...9's	64 = ...8's
14.	72 = ...9's	72 = ...8's	81 = ...9's

Give the answers:

	(*H*)	(*I*)	(*J*)	(*K*)
15.	$8\overline{)16}$	$36 \div 9$	$8\overline{)48}$	$63 \div 9$
16.	$27 \div 9$	$8\overline{)24}$	$45 \div 9$	$8\overline{)72}$
17.	$8\overline{)8}$	$72 \div 9$	$8\overline{)56}$	$81 \div 9$
18.	$18 \div 9$	$8\overline{)40}$	$\frac{1}{9}$ of 36	$8\overline{)64}$
19.	32 divided by 8	$\frac{1}{9}$ of 18	$24 \div 8$	54 divided by 9
20.	$\frac{1}{8}$ of 16	$\frac{1}{8}$ of 32	$\frac{1}{9}$ of 27	$\frac{1}{8}$ of 72
21.	$\frac{1}{9}$ of 36	$\frac{1}{9}$ of 9	$\frac{1}{8}$ of 48	$\frac{1}{9}$ of 54

SELF-TESTING DRILL NO. 24

279. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. Make your record on the Score Card. **Try to beat all your past records.**

1.
707
−507

2.
6
4
529
5
347

3.
7
748
8
454
39

4. *Subtract:*
913
603

5.
87
×6

6.
4
688
3
99

7. Multiply seventy-nine by three.

8.	9.	10.	11.	12.
$8\overline{)640}$	$680 - 672$	$636 \times 7 = ?$	$568 \div 8 = ?$	$9\overline{)639}$

13. What number is eight times ninety-eight?

14. Some boys made tracks in snow. They made a square like the one shown in the picture at the top of the page. It was 97 feet on each side. By multiplying, show how many feet a boy would walk if he went around the square in the path.

15. If a boy walked around three sides of the square and 80 feet on the fourth side, how far would he walk?

STANDARDS

Number correct..	0	1–2	3–4	5	6	7	8	9	10	11–14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

Study your mistakes so that you will not make the same kind of mistake the next time you try a drill.

280. Getting Ready to Carry in Dividing by 8 and 9. (ORAL PRACTICE.) Give the correct differences in the subtraction examples below. This practice will not only help you to subtract numbers, but it will make your division work with 8 and 9 much easier.

Tell how the first example in column (*A*) will help you in this division: ➳ $8\overline{)144}$

EXERCISE

Give the differences:

	(*A*)	(*B*)	(*C*)	(*D*)	(*E*)
1.	14−8	20−16	13−9	15−8	21−16
2.	12−9	16−9	12−8	30−24	14−9
3.	23−16	25−18	22−16	32−27	17−9
4.	15−9	36−32	24−18	37−32	31−27
5.	26−18	46−40	13−8	35−27	42−36
6.	30−27	38−32	31−24	54−48	34−27
7.	45−40	47−40	33−27	50−45	39−32
8.	44−36	70−63	43−36	52−45	63−56
9.	60−54	85−81	51−45	79−72	61−54
10.	84−81	67−64	68−64	70−64	77−72
11.	75−72	87−81	74−72	69−64	88−81
12.	80−72	89−81	66−64	76−72	53−45
13.	71−64	71−63	83−81	55−48	86−81
14.	62−54	78−72			

281. Dividing by 8 and 9 and Finding Remainders. (ORAL PRACTICE.) See how quickly you can give the answers to the examples in this article on this page and on page 358.

EXERCISE

Give the quotients, and the remainders if any:

	(*A*)	(*B*)	(*C*)	(*D*)	(*E*)	(*F*)
1.	$8\overline{)10}$	$9\overline{)13}$	$8\overline{)9}$	$9\overline{)17}$	$8\overline{)12}$	$9\overline{)20}$
2.	$9\overline{)12}$	$8\overline{)40}$	$9\overline{)15}$	$8\overline{)11}$	$9\overline{)22}$	$8\overline{)14}$
3.	$8\overline{)13}$	$9\overline{)10}$	$8\overline{)15}$	$9\overline{)24}$	$8\overline{)20}$	$9\overline{)23}$
4.	$8\overline{)24}$	$8\overline{)57}$	$9\overline{)52}$	$8\overline{)18}$	$9\overline{)37}$	$9\overline{)63}$
5.	$9\overline{)11}$	$9\overline{)14}$	$8\overline{)22}$	$9\overline{)42}$	$8\overline{)26}$	$8\overline{)19}$
6.	$8\overline{)17}$	$8\overline{)62}$	$9\overline{)36}$	$8\overline{)23}$	$9\overline{)44}$	$9\overline{)51}$
7.	$9\overline{)19}$	$9\overline{)21}$	$8\overline{)29}$	$9\overline{)30}$	$8\overline{)64}$	$8\overline{)27}$
8.	$9\overline{)25}$	$8\overline{)70}$	$9\overline{)16}$	$8\overline{)59}$	$9\overline{)32}$	$8\overline{)69}$
9.	$8\overline{)21}$	$9\overline{)35}$	$8\overline{)37}$	$9\overline{)48}$	$8\overline{)46}$	$9\overline{)31}$
10.	$9\overline{)18}$	$8\overline{)42}$	$9\overline{)26}$	$9\overline{)69}$	$9\overline{)55}$	$8\overline{)55}$
11.	$9\overline{)33}$	$9\overline{)43}$	$9\overline{)41}$	$9\overline{)45}$	$8\overline{)63}$	$9\overline{)66}$
12.	$8\overline{)25}$	$8\overline{)51}$	$8\overline{)68}$	$9\overline{)60}$	$9\overline{)61}$	$8\overline{)52}$
13.	$9\overline{)39}$	$9\overline{)49}$	$9\overline{)28}$	$8\overline{)66}$	$8\overline{)58}$	$8\overline{)43}$
14.	$8\overline{)33}$	$9\overline{)27}$	$8\overline{)48}$	$9\overline{)34}$	$9\overline{)62}$	$9\overline{)57}$
15.	$9\overline{)50}$	$8\overline{)60}$	$8\overline{)76}$	$8\overline{)30}$	$8\overline{)79}$	$9\overline{)47}$

	(A)	(B)	(C)	(D)	(E)	(F)
16.	$8\overline{)39}$	$9\overline{)84}$	$9\overline{)38}$	$9\overline{)56}$	$9\overline{)46}$	$8\overline{)72}$
17.	$9\overline{)59}$	$8\overline{)71}$	$8\overline{)61}$	$8\overline{)38}$	$9\overline{)54}$	$9\overline{)71}$
18.	$9\overline{)67}$	$9\overline{)73}$	$9\overline{)29}$	$9\overline{)40}$	$9\overline{)70}$	$9\overline{)78}$
19.	$8\overline{)32}$	$8\overline{)77}$	$8\overline{)74}$	$8\overline{)31}$	$8\overline{)47}$	$8\overline{)78}$
20.	$9\overline{)76}$	$9\overline{)64}$	$9\overline{)77}$	$8\overline{)67}$	$9\overline{)86}$	$9\overline{)87}$
21.	$8\overline{)45}$	$8\overline{)65}$	$8\overline{)75}$	$9\overline{)65}$	$8\overline{)53}$	$9\overline{)72}$
22.	$9\overline{)80}$	$9\overline{)53}$	$9\overline{)58}$	$8\overline{)56}$	$9\overline{)75}$	$8\overline{)34}$
23.	$8\overline{)50}$	$8\overline{)36}$	$8\overline{)35}$	$9\overline{)68}$	$8\overline{)28}$	$8\overline{)73}$
24.	$9\overline{)88}$	$9\overline{)89}$	$9\overline{)74}$	$8\overline{)16}$	$9\overline{)79}$	$9\overline{)82}$
25.	$8\overline{)54}$	$9\overline{)83}$	$8\overline{)41}$	$9\overline{)85}$	$8\overline{)44}$	$8\overline{)49}$

282. Practice in Dividing by 8 and 9. (WRITTEN WORK.) Copy and find the quotients in the examples below. Check your work if you are not sure that your answers are correct.

EXERCISE

1.	2.	3.	4.	5.	6.
$8\overline{)472}$	$9\overline{)144}$	$8\overline{)104}$	$9\overline{)909}$	$8\overline{)624}$	$9\overline{)531}$
7.	**8.**	**9.**	**10.**	**11.**	**12.**
$8\overline{)880}$	$9\overline{)405}$	$8\overline{)488}$	$9\overline{)324}$	$8\overline{)704}$	$9\overline{)477}$
13.	**14.**	**15.**	**16.**	**17.**	
$8\overline{)\$16.08}$	$9\overline{)\$90.09}$	$8\overline{)\$2.40}$	$9\overline{)\$6.12}$	$8\overline{)\$80.88}$	

SELF-TESTING DRILL NO. 25

283. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. **Try to beat all your past records.**

1. 98×2

2. $685 + 9 + 914 + 76$

3. $213 - 106$

4. 308×7

5. $8\overline{)520}$

6. 279×7

7. Divide 376 by 8

8. A library had 5 boxes of books to ship. Each box of books weighed 90 pounds. How much did all of the boxes of books weigh?

9. 496×9

10. $608 - 259 = ?$

11. $37 + 33 + 5 + 634 + 24 + 27 = ?$

12. $901 - 892$

13. $.71 + .82 + .97 + 5.94$

14. A dealer sold some tools for $5.40. They cost him $4.71. How much did he gain?

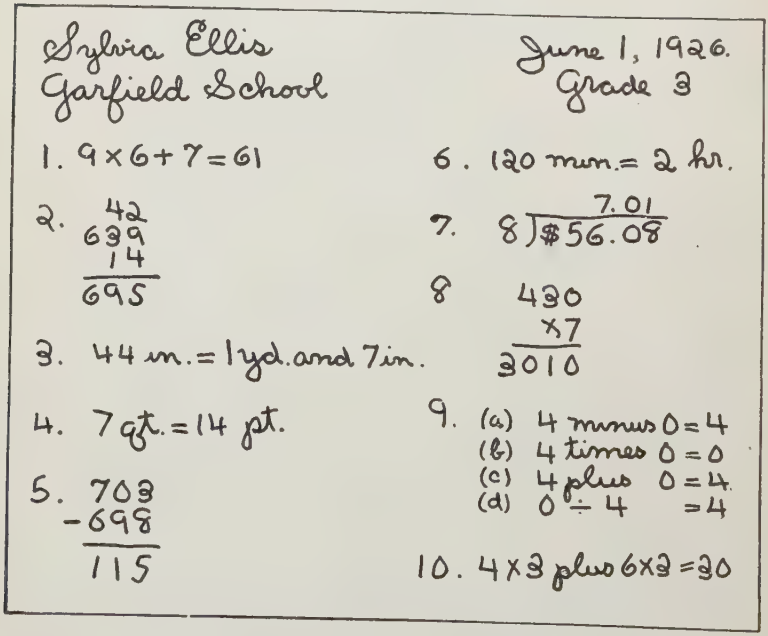
15. Subtract five dollars and ninety-three cents from nine dollars and one cent.

STANDARDS

Number correct..	0	1–2	3	4	5–6	7	8	9	10	11–14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

284. Finding Errors. (ORAL WORK.) The work shown in the picture below was done by a third-grade girl who hoped to pass into the fourth grade a few days later. But she didn't do her work very well, because she made some mistakes.

Study her work and find the mistakes. Get ready to tell the correct answers when the teacher calls on you.



How many mistakes did you find? Sylvia made four mistakes. If you didn't find all of them, look again.

Do you think Sylvia did neat work?

SELF-TESTING DRILL NO. 26

285. Directions. Time allowed: 15 minutes. Follow the directions given for Drills 1 to 5. **Try to beat all your past records.**

1.	2.	3.	4.	5.
Subtract:	621	416	91	$5\overline{)195}$
632	−389	−289	70	
189			833	
			37	
			477	

6. 911 minus 237 = ?

7. 175 and 465 plus 86 + 9 plus 4 = ?

8. 7 times 89 = ?

9. One hundred seven multiplied by eight equals what number?

10. $678 \times 9 = ?$ **11.** Divide 612 by 9

12. Four hundred seventy-two divided by eight equals what number?

13. *Add:* Seventy-eight cents, seven dollars and forty-five cents, seven cents, seventy-seven cents, and six cents.

14. $9\overline{)441}$ **15.** 8×9 plus $6 \times 9 = ?$

STANDARDS

Number correct..	0	1	2	3	4	5	6	7	8–9	10–14	15
Scores.....	0	1	2	3	4	5	6	7	8	9	10

If you got a high score on this drill, you will be a good worker ready for fourth-grade arithmetic.

SUMMARY

286. General Review. (Written Work.) The 25 examples and problems in this article will give you a good chance to prove that you have learned many of the things you should know about arithmetic

1. Which is larger, $9\times6+7$ or $8\times7+6$?

2. How long is it from 9 o'clock until 11:30 o'clock?

3. Which is smaller, $8\times8+6$ or $9\times7+5$?

4. *Fill in the blanks:*

(*a*) ..... $\times7=35$ (*f*) $6\times8=$.....

(*b*) $28+$..... $=45$ (*g*) $9\times8+7=$.....

(*c*) $54=$.....9's (*h*) $8=56\div$.....

(*d*) $50-$..... $=36$ (*i*) $65-25=$.....

(*e*) ..... $\times$ ..... $=49$

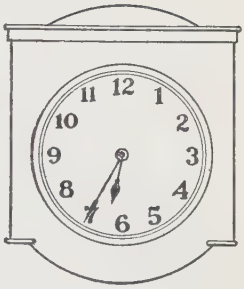
5. Would you rather have $9+0$ mosquito bites or 9×0 mosquito bites?

6. Harris counted 8 buds on each of five rose bushes. Should he subtract, multiply, or divide to find out how many buds there were in all?

7. Mary was in the sixth grade and was 12 years old. She told John that she was twice as old as her little sister. How old do you think her sister was?

8. How much change should John receive from a one-dollar bill if he bought a pound of coffee at 40¢ a pound and 3 spools of thread at 5¢ a spool?

9. What time does the clock at the right show?



10. How much larger is one hundred twenty-eight than seventy-nine?

11. How many feet are there in 6 yards?

12. Check the answer to the example in the box at the right. If the printed answer is not correct, work the example and show the check for your answer.

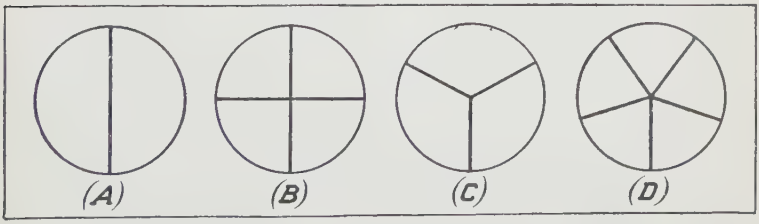
$$8\overline{)872}$$
$$110$$

Write the missing numbers:

13. 1 ft. = ... in.
14. 1 yd. = ... ft.
15. 1 gal. = ... qt.
16. 1 dollar = ... dimes.
17. 1 week = ... days.
18. 1 hr. = ... min.
19. 1 lb. = ... oz.
20. \$1 = ... ¢.

21. *Add and check:* two hundred six, seventeen, eight hundred eighty, and ninety-four.

22. Which circle below is divided into thirds?



23. 8 plus 8 =

24. 8 minus 8 =

25. Divide 3 dollars and 75 cents by 5.

SUMMARY OF THIRD-GRADE WORK

287. A Yes-No Test. (Oral or Written Work.) Read each statement in this article. Decide whether it is true or not true. If it is true, say or write *Yes*. If it is not true, say or write *No*. After reading each question, think: "Is it true?"

Study the samples. They are answered correctly.

Samples: 4×1 is more than 9×0 ..... *Yes*
You don't need to study to learn arithmetic ..... *No*

1. The sum is the answer in multiplication. .....

2. "Find the difference" means "subtract." .....

3. The answer to 4×0 is 4. .....

4. You always have to carry in adding a column. .....

5. In the example 40....10 is 30, the missing sign is the minus sign. .....

6. Seventeen less nine means to multiply. .....

7. Ninety-six may be written with two figures. .....

8. There are 5 dimes in fifty cents. .....

9. Forty-three cents is the same as \$43. .....

10. If you have \$4.00 and want to find how much more you need in order to have \$12.00, you should add. .....

11. If you add zero to $6+7$, the sum is 14. .....

12. It is easy to add when figures are not in straight columns. .....

13. In the number 4362, the 3 is in the hundreds' place. .....

14. You always add or subtract to get answers to problems. .....

15. If you take zero from 13 minus 4, the answer is 8. .....

16. Checking work in arithmetic is a good way to keep from making mistakes. .....

17. To estimate a reasonable answer you must find the correct answer. .....

18. Sometimes there are two zeros in a product. .....

19. If you add 5 zeros together, the sum is 5. .....

20. In adding columns, sometimes you don't carry any number, and sometimes you carry different numbers. .....

21. You don't need to read carefully to learn arithmetic. .....

22. Seven dimes and three cents equal $.73. .....

23. If you take 1 dime from 6 dimes and 7 cents, you have 57¢ left. .....

24. The number 403 is read "four hundred thirty." .....

25. Thirty-one can be subtracted from twenty-nine. .....

26. You never get zero in an answer in subtraction. .....

27. 1000 is read "ten thousand." .....

28. $13+2$ is more than 13×2. .....

29. The answer to 6×3 is the same as the answer to $20-2$. .....

30. $0\times0=0+0$. .....

31. Three hundred twenty times 4 means to add. .....

32. You can do better work in arithmetic if you use the Self-Help Practice Lessons. .....

33. There are seven days in a week. .....

34. Some months have five Saturdays. .....

35. There are 29 days in 4 weeks. .....

36. You never have to carry in multiplication. .....

37. $36\div6$ means "How many sixes are there in thirty-six?" .....

38. There are 18 inches in one and a half feet. .....

39. One yard minus 6 inches equals 30 inches. .....

40. There are four feet in a yard. .....

41. $\frac{1}{3}$ of an apple is larger than $\frac{1}{2}$ of it. .....

42. To find $\frac{1}{3}$ of a number you divide the number by 3. .....

43. A dozen means 14. .....

44. Six inches are one-half of 12 in. .....

45. Two feet and seven inches are more than a yard. .....

46. Three pints are less than two quarts. .....

47. Four gallons equal 16 quarts. .....

48. One pound plus 4 ounces equals 20 ounces. .....

49. One hour plus ten minutes equals 40 minutes. .....

50. I have improved my scores on the Self-Testing Drills this year. .....

THE ONE HUNDRED ADDITION FACTS

288. The Easy 45 Addition Facts. (For Self-Help Practice.) A good arithmetic worker must know these 45 facts so that he can give their sums quickly.

A good way to practice is to lay paper over the answers and say the sums to someone else or to yourself. If you come to one that you can't add **quickly,** look at the sum. Then cover the sums again and go on. Try to remember the sums you didn't know.

1.	3	1	2	1	2	1	2	1	2
	2	4	1	3	2	1	5	2	3
	5	**5**	**3**	**4**	**4**	**2**	**7**	**3**	**5**
2.	1	2	1	2	3	1	2	4	1
	5	4	6	7	1	7	8	1	8
	6	**6**	**7**	**9**	**4**	**8**	**10**	**5**	**9**
3.	4	1	3	5	4	3	2	6	5
	2	9	3	1	3	5	6	1	2
	6	**10**	**6**	**6**	**7**	**8**	**8**	**7**	**7**
4.	7	6	5	3	8	7	6	4	9
	1	2	3	4	1	2	3	4	1
	8	**8**	**8**	**7**	**9**	**9**	**9**	**8**	**10**
5.	8	5	5	3	4	7	3	4	6
	2	4	5	7	6	3	6	5	4
	10	**9**	**10**	**10**	**10**	**10**	**9**	**9**	**10**

289. The Harder 36 Addition Facts. (For Self-Help Practice.) Practice until you can give the sums in less than a minute. Cover the answers.

1.	8	9	4	9	9	9	6	6	5
	9	7	7	9	8	2	5	9	8
	17	**16**	**11**	**18**	**17**	**11**	**11**	**15**	**13**
2.	9	6	4	5	8	7	4	3	8
	6	8	8	9	4	8	9	8	8
	15	**14**	**12**	**14**	**12**	**15**	**13**	**11**	**16**
3.	8	7	7	8	9	9	7	7	5
	6	7	6	3	5	3	9	4	7
	14	**14**	**13**	**11**	**14**	**12**	**16**	**11**	**12**
4.	9	6	8	6	3	8	2	7	5
	4	6	5	7	9	7	9	5	6
	13	**12**	**13**	**13**	**12**	**15**	**11**	**12**	**11**

After you can quickly give the sums for all the examples in this article and in Article 288, turn back and practice on the 100 addition facts (pages 17 and 18) without answers. Pick out the examples that seem hardest to remember and practice most on them. Write them on slips of paper or cardboard with correct answers on the back, and then practice by laying them down as fast as you can give the sums.

☞ **Watch the 19 Zero Facts!** When you practice the 100 addition facts, be sure not to get caught on an example with zero in it. Turn **now** and read again what is said about "Zero in Addition" on page 15.

THE ONE HUNDRED SUBTRACTION FACTS

290. The Easy 36 Subtraction Facts. (For Self-Help Practice.) Practice on these examples in the same way that you practiced on the addition facts.

1.	2	3	4	3	4	5	4	5	5
	1	1	2	2	1	4	3	1	2
	1	**2**	**2**	**1**	**3**	**1**	**1**	**4**	**3**
2.	6	5	6	6	6	6	7	8	7
	3	3	1	5	2	4	1	2	3
	3	**2**	**5**	**1**	**4**	**2**	**6**	**6**	**4**
3.	7	8	7	8	7	9	8	8	9
	6	5	2	1	4	1	7	6	3
	1	**3**	**5**	**7**	**3**	**8**	**1**	**2**	**6**
4.	8	9	9	9	7	9	9	8	9
	4	6	8	2	5	5	7	3	4
	4	**3**	**1**	**7**	**2**	**4**	**2**	**5**	**5**

291. The Harder 45 Subtraction Facts. (For Self-Help Practice.) These are harder facts to learn; so work hard until you can give the answers quickly without making one mistake. Cover the answers.

1.	10	11	12	10	14	10	12	14	10
	8	2	4	9	7	1	5	8	5
	2	**9**	**8**	**1**	**7**	**9**	**7**	**6**	**5**
2.	12	10	13	10	11	10	11	14	11
	6	2	6	7	6	3	5	9	3
	6	**8**	**7**	**3**	**5**	**7**	**6**	**5**	**8**

3.	15	12	13	11	15	12	13	18	15
	7	7	9	4	8	8	7	9	6
	8	**5**	**4**	**7**	**7**	**4**	**6**	**9**	**9**
4.	12	10	13	16	11	14	12	16	17
	3	6	5	8	9	6	9	9	8
	9	**4**	**8**	**8**	**2**	**8**	**3**	**7**	**9**
5.	14	15	10	11	13	11	17	16	13
	5	9	4	8	8	7	9	7	4
	9	**6**	**6**	**3**	**5**	**4**	**8**	**9**	**9**

Turn to pages 38 and 39 and practice giving the answers for The One Hundred Subtraction Facts. They are printed there without answers. Pick out the ones that are hard for you to remember, and write them on slips of paper or cardboard as you did for addition. Then practice on these hard ones.

☞ **Watch the 19 Zeros in Subtraction!** If the zeros bother you when you practice the subtraction facts on pages 38 and 39, read what is said about "Zero in Subtraction" on page 37.

THE ONE HUNDRED MULTIPLICATION FACTS

292. The 64 Multiplication Facts with 0, 1, 2, and 3. (For Self-Help Practice.) Cover the answers with a paper and practice saying the products until you can say them about as fast as you can read.

1.	3	2	1	8	2	5	0	3
	2	4	0	1	7	2	6	3
	6	**8**	**0**	**8**	**14**	**10**	**0**	**9**

2.	4	1	7	0	3	3	8	7
	0	9	3	8	1	5	2	0
	0	**9**	**21**	**0**	**3**	**15**	**16**	**0**
3.	1	3	0	6	4	0	6	2
	5	6	2	1	2	1	3	1
	5	**18**	**0**	**6**	**8**	**0**	**18**	**2**
4.	3	2	3	2	1	2	0	1
	7	2	4	8	3	6	0	4
	21	**4**	**12**	**16**	**3**	**12**	**0**	**4**
5.	0	8	9	6	2	0	1	3
	9	3	1	0	5	7	2	0
	0	**24**	**9**	**0**	**10**	**0**	**2**	**0**
6.	1	0	7	4	1	5	4	2
	8	5	2	3	1	3	1	9
	8	**0**	**14**	**12**	**1**	**15**	**4**	**18**
7.	2	5	3	1	2	9	7	9
	0	1	8	6	3	0	1	3
	0	**5**	**24**	**6**	**6**	**0**	**7**	**27**
8.	1	8	9	3	1	0	6	5
	4	0	2	9	7	3	2	0
	4	**0**	**18**	**27**	**7**	**0**	**12**	**0**

293. The 20 Multiplication Facts with 4 and 5.* (For Self-Help Practice.) Practice until you can give the products quickly and without a mistake. Cover answers.

*Facts not given in Article 292.

1.	5	4	7	5	4	9	5	5	6	8
	4	8	4	7	6	4	8	6	4	4
	20	**32**	**28**	**35**	**24**	**36**	**40**	**30**	**24**	**32**
2.	6	5	4	5	4	8	4	7	4	9
	5	9	5	5	7	5	9	5	4	5
	30	**45**	**20**	**25**	**28**	**40**	**36**	**35**	**16**	**45**

294. The 16 Multiplication Facts with 6, 7, 8, and 9.* (For Self-Help Practice.) Practice on the facts below as you did in Articles 292 and 293.

1.	7	8	6	7	6	9	8	6
	6	8	9	7	8	6	9	7
	42	**64**	**54**	**49**	**48**	**54**	**72**	**42**
2.	9	9	7	9	8	8	7	6
	8	7	8	9	6	7	9	6
	72	**63**	**56**	**81**	**48**	**56**	**63**	**36**

THE NINETY DIVISION FACTS

295. The 50 Division Facts with 1, 2, 3, 4, and 5. (For Self-Help Practice.) Cover the answers and practice giving the quotients.

	2	**4**	**6**	**0**	**9**	**0**	**2**	**0**	**1**
1.	$1\overline{)2}$	$4\overline{)16}$	$3\overline{)18}$	$2\overline{)0}$	$1\overline{)9}$	$1\overline{)0}$	$5\overline{)10}$	$4\overline{)0}$	$2\overline{)2}$
	5	**1**	**5**	**4**	**9**	**7**	**3**	**0**	**8**
2.	$2\overline{)10}$	$5\overline{)5}$	$4\overline{)20}$	$3\overline{)12}$	$2\overline{)18}$	$1\overline{)7}$	$5\overline{)15}$	$3\overline{)0}$	$4\overline{)32}$

*Facts not given in Articles 292 and 293.

3.	9	1	1	4	9	2	1	7
	5)45	4)4	3)3	2)8	3)27	2)4	1)1	2)14
4.	2	0	7	3	3	3	5	4
	3)6	5)0	4)28	3)9	2)6	1)3	3)15	5)20
5.	4	6	7	2	5	9	5	8
	1)4	2)12	5)35	4)8	5)25	4)36	1)5	2)16
6.	7	3	8	8	6	6	6	8
	3)21	4)12	5)40	3)24	1)6	4)24	5)30	1)8

296. The 40 Division Facts with 6, 7, 8, and 9. (For Self-Help Practice.) See how quickly you can give the quotients without making a mistake.

1.	2	9	0	2	1	8	7
	6)12	9)81	7)0	8)16	9)9	6)48	8)56
2.	5	0	2	5	9	1	5
	7)35	9)0	7)14	6)30	7)63	8)8	9)45
3.	1	4	7	2	9	0	1
	6)6	8)32	7)49	9)18	8)72	6)0	7)7
4.	0	4	9	8	3	3	5
	8)0	9)36	6)54	8)64	6)18	9)27	8)40
5.	6	3	7	8	4	6	7
	6)36	7)21	9)63	7)56	6)24	8)48	6)42
6.	8	6	3	4	6
	9)72	7)42	8)24	7)28	9)54

TABLES OF MEASURE

LENGTH

12 inches (in.) = 1 foot (ft.)
3 feet = 36 inches = 1 yard (yd.)

WEIGHT

16 ounces (oz.) = 1 pound (lb.)

TIME

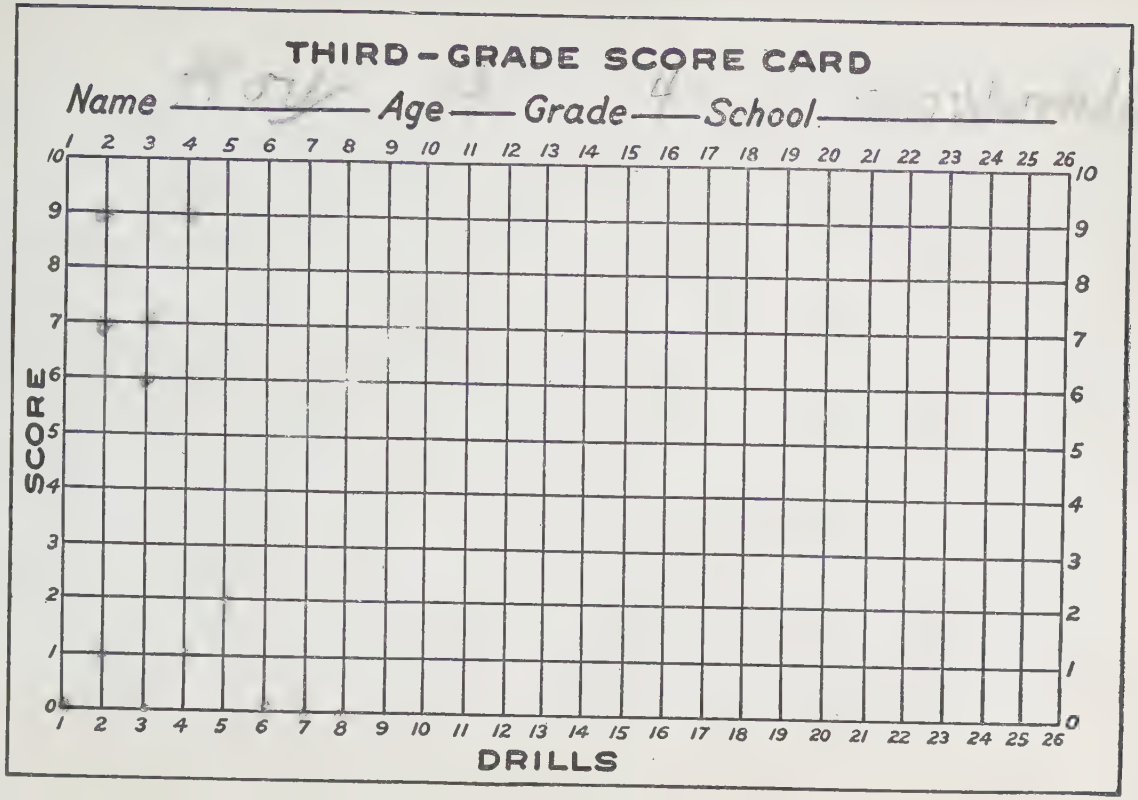
60 minutes = 1 hour (hr.) 24 hours = 1 day (da.)
7 days = 1 week (wk.)

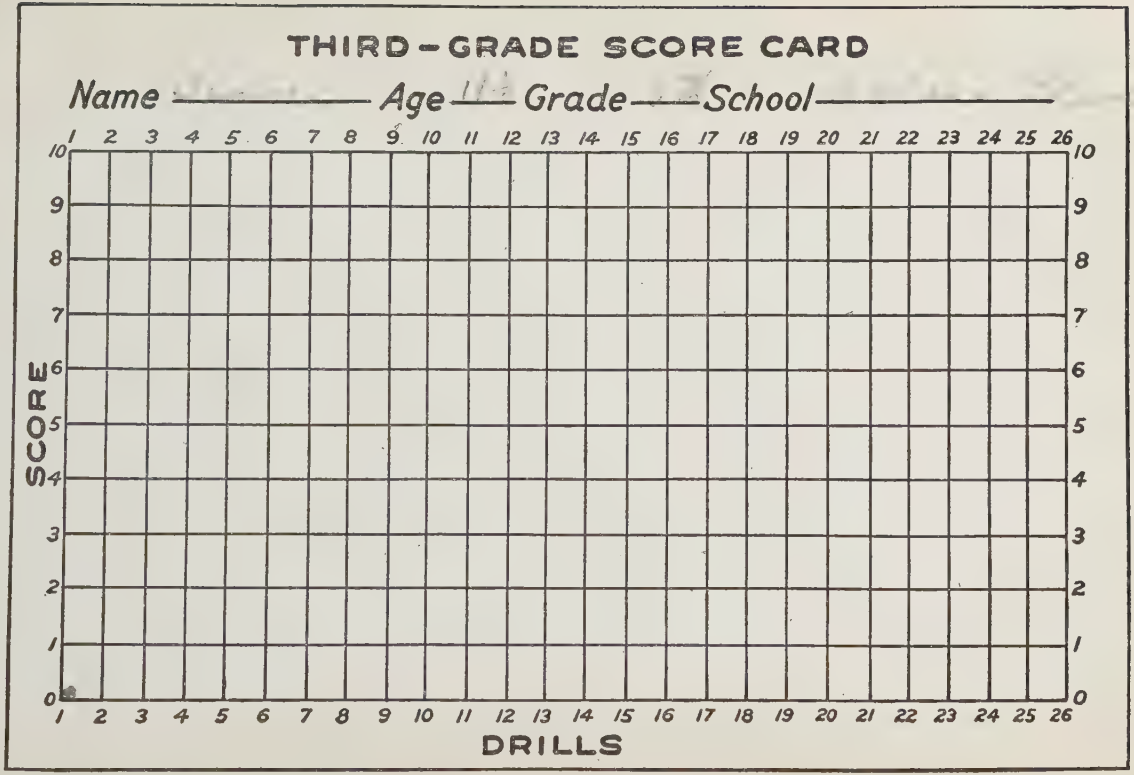
MEASURE

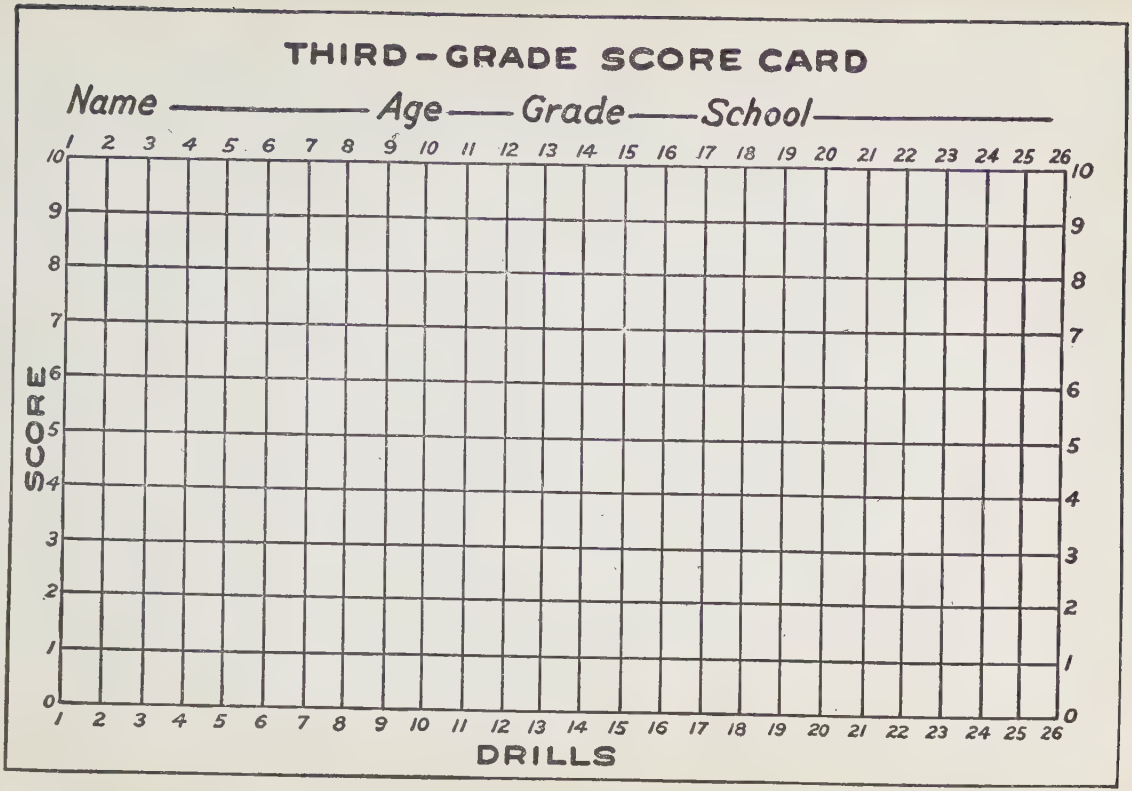
2 glassfuls = 1 pint (pt.) 2 pints = 1 quart (qt.)
4 quarts = 1 gallon (gal.)

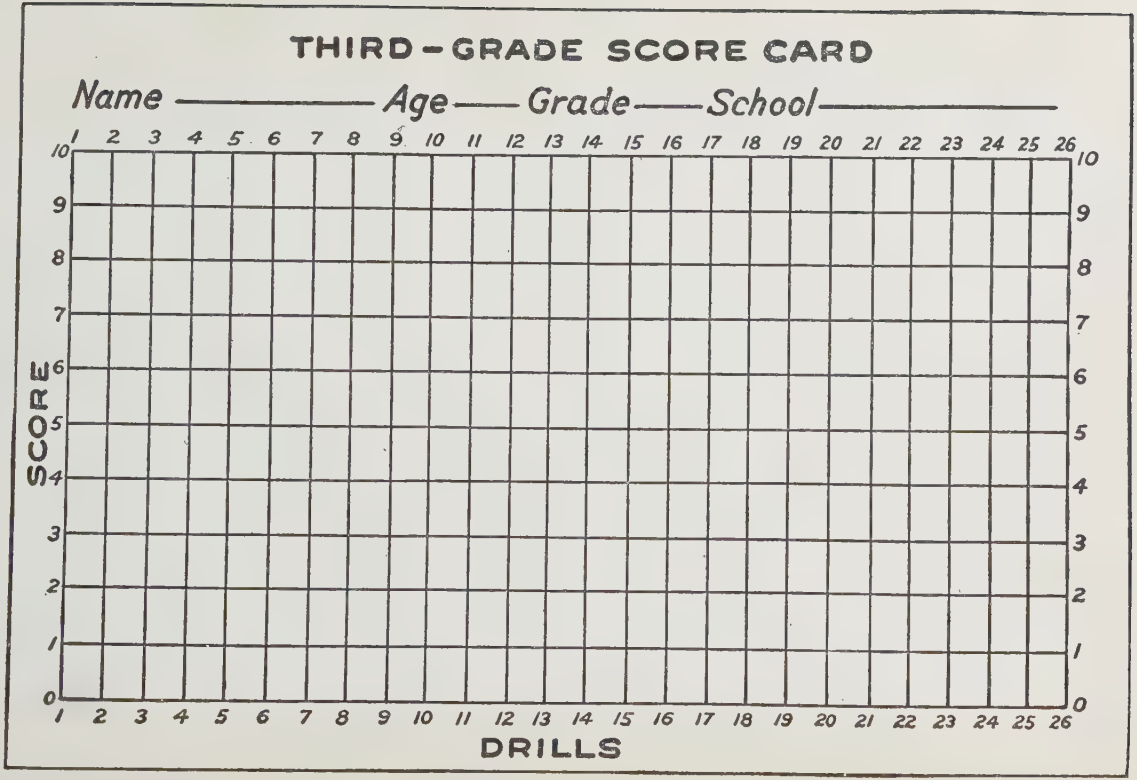
THE DOZEN

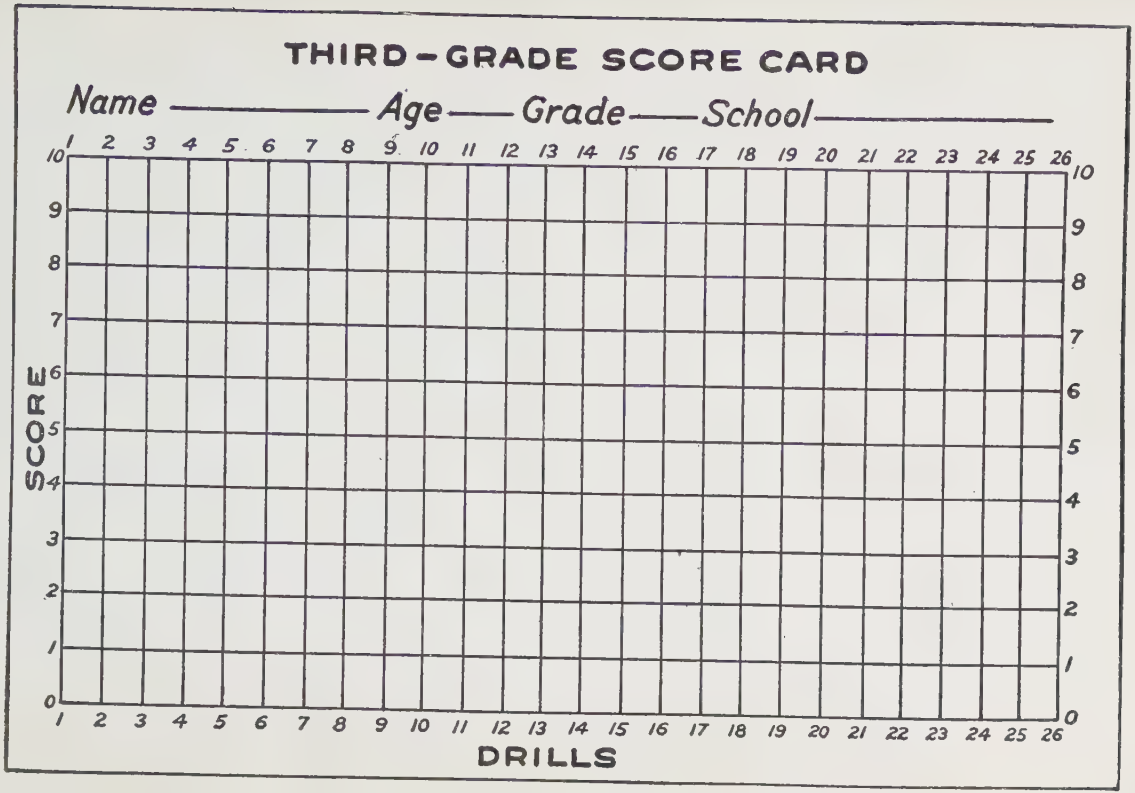
1 dozen (doz.) = 12

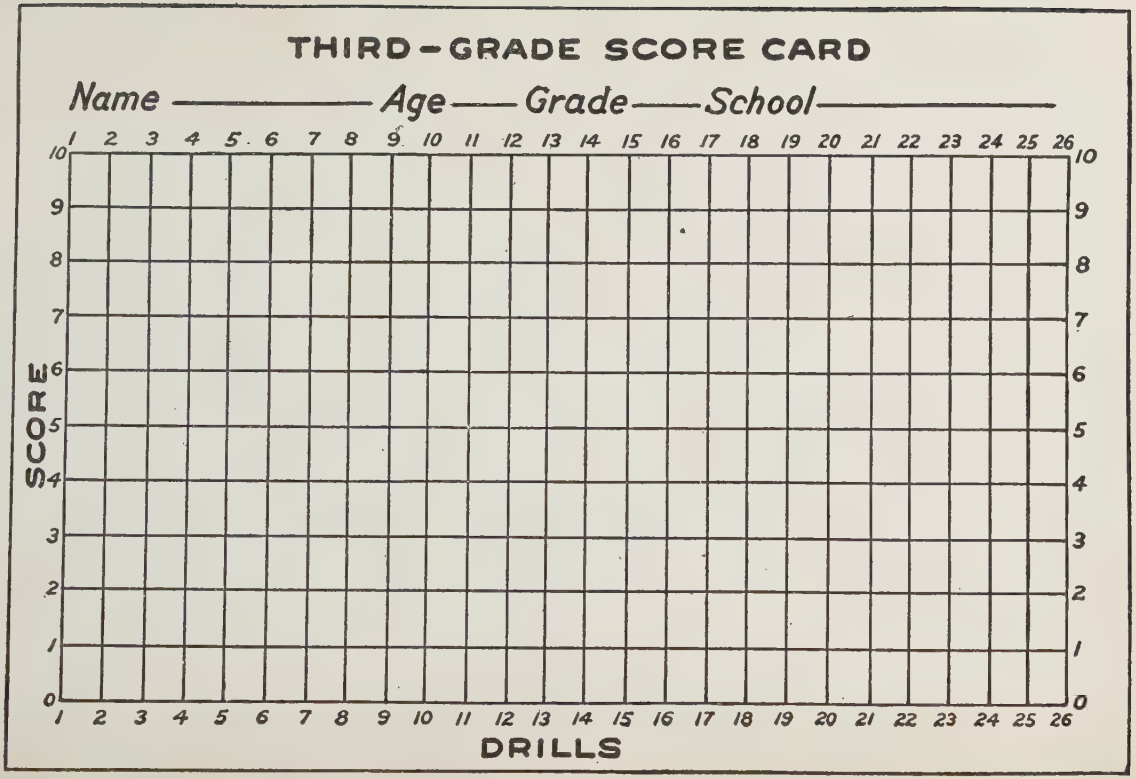

THIRD-GRADE SCORE CARD
Name
Age
Grade
School
SCORE
DRILLS
0 1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26


THIRD-GRADE SCORE CARD
Name
Age
Grade
School
SCORE
DRILLS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
0 1 2 3 4 5 6 7 8 9 10


THIRD-GRADE SCORE CARD
Name
Age
Grade
School
SCORE
DRILLS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
0 1 2 3 4 5 6 7 8 9 10


THIRD-GRADE SCORE CARD
Name
Age
Grade
School
SCORE
DRILLS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
0 1 2 3 4 5 6 7 8 9 10


THIRD-GRADE SCORE CARD
Name
Age
Grade
School
SCORE
DRILLS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
0 1 2 3 4 5 6 7 8 9 10


THIRD-GRADE SCORE CARD
Name
Age
Grade
School
SCORE
DRILLS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
0 1 2 3 4 5 6 7 8 9 10

INDEX

(Numbers refer to pages)

Abbreviations, "foot" and "feet," 250; "inch" and "inches," 250; "yard" and "yards," 250; "pint" and "pints," 282; "quart" and "quarts," 282; "ounce" and "ounces," 303; "pound" and "pounds," 303; "dozen," 305; "hour," 330; "minute," 330

Answers, naming, 84; estimating, 88-91

Add, defined, 7

Addition, with sums to ten, 3-12; with sums eleven to eighteen, 14; zero in, 15, 100, 107; the 100 facts, 17, 368; column (no carrying), 48; by endings, 56-59; column (with carrying), 83-85; checking, 93; carrying more than once, 105-106; sign of, 9; with dollars and cents, 113. **Practice:** 12, 14, 16, 17, 45, 47, 49, 50, 54-55, 57-66, 85, 97, 101-103, 104-105; 108, 110, 113, 114. *See also* Rapid Drills and Multiplication, carrying in

Calendar, 230-231

Carrying, explained, 83-85. *See also* Addition, Subtraction, Multiplication, and Division

Cent, illustrated, 18; sign for, 19; cents' point, 111

Checking ("proving"), in addition, 93-94; in subtraction, 132-133; in division, 278

Clock, the, 328-330

Coin, defined, 18

Column addition, explained, 10

Counting, 1, 68, 171

Difference, defined, 27

Differences, individual, provision for. *See* Extra Practice

Dime, 18-19

Division, sign for, 238; by 2 and 3, 233-235; by 4, 254; by 5, 266; by 0, 283; by 6, 332; by 7, 343; by 8 and 9, 353; carrying in, 294-297; check for, 278; the 90 facts of, 373-374. **Practice:** 235, 241, 255, 266, 267, 274, 279, 293, 297, 300-302, 312, 332, 333, 334, 344, 345, 354, 357-358. *See also* Rapid Drills

Dollars and cents, reading and writing, 111-112; adding, 113-114; subtracting, 118-122, 149; dividing, 310-312

Dollar sign, 111

Dozen, 305

Equals sign, 8-9

Estimating answers, 88, 91, 194-195, 252, 322-323

Extra practice, for good workers, 28, 52, 114, 136, 202, 216, 351

Figure (integer), defined, 13

Foot, 246-247

Fourths, meaning and use of, 257-262; how written, 257; how to find one-fourth of a number, 262

Fractions, introduced, 257; meaning and use of $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, 257-262; practice in finding $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ of numbers, 262, 267-268

Gallon, 281, 375

Glassful, 281, 375

Halves, meaning and use of, 257-262; how written, 257; how to find one-half of a number, 260
Hour, 320, 375

Inch, 246-247, 375

Large numbers, reading and writing, 275-277

Measures, of length, 246-251; liquid, 280-282; of weight, 303-304; practice with, 247-251, 282, 304-305; tables of, 375
Minus sign, 34, 36
Minute, 329
Multiplication, sign of, 161; two in, 159, 173; three in, 164; one in, 174; zero in, 176; five in, 214; four in, 225; six in, 320; seven in, 336; eight in, 348; nine in, 348; carrying in, 188-191; 204-208; in division, 240-241; the 100 facts of, 371-372. **Practice:** 178, 183, 185, 191, 197, 204, 205, 206, 207, 208, 212, 218, 221-222; 226, 227, 228, 229, 254, 266, 321, 322, 326, 327, 337-338, 343, 348, 350-351. 353. *See also* Rapid Drills

Neatness, 10, 50, 72-73
Nickel, 18-19

Ounce, 303-304, 375

Pint, 280-282, 375
Plus sign, 8
Pound, 303-304, 375
Problems*, list of: 3 (A); 6 (A); 21 (S); 24 (S); 25 (S); 27-28 (A and S); 42-43 (S); 46 (S); 51-53 (A and S); 70 (A); 75 (A and S); 91-92 (A); 94 (A); 109 (A); 123 (A and S); 134-136 (A and S); 150 (S); 151-152 (A and S); 171-173 (M); 179 (M); 195-196 (A, S, M, D); 216-217 (M and A); 243-244 (M and D); 268 (fractions); 288 (measures). *See also* Problem Scales
Problem Scales, explained, 199-200; list of; *1*, 200; *2*, 208; *3*, 219; *4*, 224; *5*, 236; *6*, 253; *7*, 263; *8*, 286; *9*, 297; *10*, 307; *11*, 312; *12*, 324; *13*, 339; *14*, 346
Problem solving, advice on, 86-87, 170, 194, 252, 285
Product, defined, 185
Proving. *See* Checking

Quart, 281, 375
Quarter, illustrated, 18
Quotient, defined. 274

Rapid Drills (mixed fundamentals), 69, 103, 115, 131, 175, 186, 198, 213, 230, 269, 288, 308, 315, 327, 339
Reading Numbers, to 1000, 78; above 1000, 275-278; reading dollars and cents, 112
Remainders, in division, 290-291, 293, 333, 344-345, 357
Reviews, 19 (general), 26 (subtraction), 29 (vocabulary), 46 (general), 67 (subtraction and adding by endings), 71 (vocabulary), 74 (addition, subtraction, and vocabulary), 76 (general), 101 (addition with carrying), 116 (general), 139 (addition), 157 (general), 187 (general), 212 (multiplication), 229 (multiplication), 232 (general), 255 (division), 267 (fractions and division), 271 (general), 316 (addition, multiplication, subtraction, and division), 317 (general), 322

*The letters following page references indicate addition, subtraction, multiplication, or division.

Reviews (Continued)
(addition, subtraction, multiplication), 349 (addition, subtraction, multiplication, and division), 362 (general), 364 (of third-grade work)

Self-Help Practice Lessons, 368-374
Self-Testing Drills, explained, 152-154; list of: *1*, 156; *2*, 162; *3*, 168; *4*, 177; *5*, 184; *6*, 192; *7*, 203; *8*, 210; *9*, 223; *10*, 242; *11*, 256; *12*, 265; *13*, 270; *14*, 284; *15*, 292; *16*, 299; *17*, 306; *18*, 309; *19*, 314; *20*, 331; *21*, 334; *22*, 342; *23*, 352; *24*, 354; *25*, 359; *26*, 361
Signs, 8-9, 19, 35, 36, 111, 161; practice in use of, 162, 181, 239, 349
Squares, drawing, 2
Store, playing, 6
Subtract, meaning of, 23, 24, 25
Subtraction (*a*) finding how many are left, 21; (*b*) finding how many more are needed, 24; (*c*) finding the difference, 25-26; with minuends less than ten, 21-26, 30-31; with minuends ten to eighteen, 32, 34; zero in, 37; the 100 facts, 38-39, 370-371; with two-figure numbers, 41-45; with dollars and cents, 118-122; borrowing in ("take away" method), explained, 119-122, 124-126; carrying in ("Austrian" method), explained, 127-130; in division, 290; sign of, 35. **Practice:** 23, 30-36, 37, 38-39, 40, 43, 67, 103, 118-119, 127, 137, 138, 141, 148-149, 290, 291, 293, 333, 344-345, 356, 357
Sum, defined, 7

Tables of Measure, of length, 250; liquid, 282; of weight, 303; of time, 329; general, 375
Telling time, 328-330
Thirds, meaning and use of, 257-262; how written, 257; how to find one-third of a number, 261
Time, telling, 328-330; table of, 329, 375
"Times" sign, 161

United States money, 18-19, 82, 111-114, 118-122

Vocabulary, 7-10, 13, 15, 18, 23, 26, 185

Writing numbers, 80; writing dollars and cents, 112; writing larger numbers 275-277

Yard, 249-250, 375
Yes-No Test, 364

Zero, defined, 15; in addition, 15; in subtraction, 37; in division, 283; in multiplication, 176